

DOCUMENT RESUME

ED 455 435

CE 082 100

AUTHOR Dykman, Ann; Mandel, David R.
TITLE Educating Career & Technical Education Teachers: Building a New Model. Symposium Proceedings (Washington, DC, June 13-14, 2000).
INSTITUTION MPR Associates, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE 2001-01-00
NOTE 81p.
AVAILABLE FROM ED Pubs, P.O. Box 1398, Jessup, MD 20794-1398. Tel: 800-872-5327 (Toll Free); Tel: 877-433-7827 (Toll Free); TDD/TTY: 800-437-0833 (Toll Free); Web site: <http://www.ed.gov/pubs/edpubs.html>. For full text: <http://www.mprinc.com/html/pdf/newmodel.pdf>.
PUB TYPE Collected Works - Proceedings (021)
EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Academic Standards; Beginning Teacher Induction; Career Education; Education Work Relationship; Educational Certificates; Educational Quality; Educational Trends; Futures (of Society); High Schools; Higher Education; Inservice Teacher Education; Integrated Curriculum; *Knowledge Base for Teaching; Standards; *Teacher Certification; Teacher Competencies; *Teacher Education; Teacher Education Programs; *Teacher Effectiveness; Teacher Recruitment; *Vocational Education; *Vocational Education Teachers
IDENTIFIERS *Career and Technical Education

ABSTRACT

This proceedings was held to help states, universities, and local education agencies discuss and debate the current state of teacher education in the field of career and technical education (CTE). Section 1 presents these two opening addresses: "Educating CTE Teachers" (Patricia W. McNeil) and "Preparing Teachers for the Challenge of Education in the Next Century" (Bruce Alberts). Section 2 discusses and debates issues related to a 21st century vision of CTE: role of academics in CTE, structuring of teacher education programs, how best to connect instruction to the work world, and purpose of CTE. Section 3, on content and structure of CTE teacher education, focuses on what teachers should know and be able to do; improving initial preparation; providing support to new CTE teachers; and building the knowledge base of existing CTE teachers. Section 4 addresses how to improve recruitment of future CTE teachers. Section 5, on quality assurance in CTE teaching, describes two groups contributing to the teacher quality standards movement: National Board for Professional Teaching Standards and National Council for Accreditation of Teacher Education. A conclusion summarizes the major points that authors say the CTE leadership community agrees upon: what all students should know and be able to do when they graduate from high school and what learning experiences will get them there; what CTE teachers need to know and be able to do to make this happen; what academic teachers need to know and be able to do to work constructively with CTE teachers; and what changes in teacher education are needed to provoke the kind and quality

of teaching America's students need. Appendixes include the symposium agenda and participants list. (YLB)

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

This document has been reproduced as
received from the person or organization
originating it.

Minor changes have been made to
improve reproduction quality.

Points of view or opinions stated in this
document do not necessarily represent
official OERI position or policy.

Educating Career & Technical Education Teachers

BUILDING A NEW MODEL

*June 13-14, 2000
Symposium Proceedings*

BEST COPY AVAILABLE

*Ann Dykman
David R. Mandel
MPR Associates, Inc.*



*Sponsored by
U.S. Department of Education, Office of Vocational and Adult Education*

Educating Career & Technical Education Teachers

BUILDING A NEW MODEL

June 13-14, 2000

Symposium Proceedings

Ann Dykman

David R. Mandel

MPR Associates, Inc.

Sponsored by

U.S. Department of Education, Office of Vocational and Adult Education

This report was prepared for the U.S. Department of Education. The views expressed herein are those of the contractor. No official endorsement by the U.S. Department of Education is intended or should be inferred.

January 2001

The text of this document is in the public domain. While permission to reprint this publication is not necessary, the citation should be: U.S. Department of Education, Office of Vocational and Adult Education, *Educating Career and Technical Education Teachers: Building a New Model*, Washington, DC, 2000.

To order copies of this report, write:

ED Pubs
Editorial Publications Center
U.S. Department of Education
P. O. Box 1398
Jessup, MD 20794-1398;

via fax, dial (301) 470-1244;

or via electronic mail, send your request to: edpubs@inet.ed.gov.

You may also call toll-free: 1-877-433-7827 (1-877-4-ED-PUBS). If 877 service is not yet available in your area, call 1-800-872-5327 (1-800-USA-LEARN). Those who use a telecommunications device for the deaf (TDD) or a teletypewriter (TTY) should call 1-800-437-0833.

To order online, point your Internet browser to: www.ed.gov/pubs/edpubs.html

On request, this publication is available in alternative formats, such as Braille, large print, audiotape, and computer diskette. For more information, please contact the Department's Alternate Format Center at (202) 205-8113.

MPR Associates Staff
Publishing Manager: Barbara Kridl
Senior Editor: Andrea Livingston
Graphic Designer/Desktop Publisher: Leslie Retallick

Acknowledgments



The authors would like to thank all those who contributed to the creation of these proceedings.

First and foremost, this publication owes everything to the symposium participants—the presenters and attendees who contributed their thoughts and ideas about ways to improve career and technical teacher education and who demonstrated their commitment to the field just by being present. They provoked a series of lively discussions, challenged the conventional wisdom, and did not shy away from taking a self-critical look at their field, the gist of which we attempt to faithfully record in the following pages.

The accurate recording of the conversation would not have been possible without MPR Associates' note-takers, who helped the authors cover many of the breakout sessions during the symposium. Thanks to Sharon Anderson, Denise Bradby, Kathy Chernus, Doug Lauen, and Fena Neustaedter.

Key staff of the U.S. Department of Education's Office of Vocational and Adult Education—led by Peggi Zelinko and including Ricardo Hernandez, George Spicely, and Susan Toy—helped structure the symposium, conceive the major themes around which it was organized, and identify leading practitioners, administrators, and scholars to participate in the program. We are grateful for their insights and good counsel.

Table of Contents

Acknowledgments	iii
Introduction	1
The Big Picture: Opening Addresses	5
Patricia W. McNeil, Assistant Secretary for Vocational and Adult Education, U.S. Department of Education	5
Bruce Alberts, President, National Academy of Sciences	8
A 21 st -Century Vision of Career and Technical Education	13
Academics in Career and Technical Education	15
Career Clusters	18
Connecting Instruction to the Work World	19
Long-Term Objectives	21
The Content and Structure of CTE Teacher Education	25
What Teachers Should Know and Be Able to Do	25
Improving Initial Preparation	29
Professional Development Schools	30
Modeling Integration	32
Alternative Routes to Licensure	35
Providing Support to New CTE Teachers	38
Building the Knowledge Base of Existing CTE Teachers	41
Improving Recruitment of Future CTE Teachers	47
Quality Assurance in CTE Teaching—Licensing and Advanced Certification	51
National Board for Professional Teaching Standards	52
National Council for Accreditation of Teacher Education	54
Conclusion	57
Appendices	61
A. Symposium Agenda	63
B. Final Participants List	67

Introduction



As schools across the country have focused over the past several years on improving the academic achievement of their students, strengthening teacher education has become a central policy concern. To date, these policy discussions have been mostly limited to improving the preparation of academic teachers. Career and technical education, which many assume has very little to do with academics, has received scant attention.

This neglect of career and technical education (CTE) is unfortunate. Many high school students are still very interested in its programs and courses, and there are strong CTE programs around the country that not only prepare people for careers and lifelong learning but also help advance their understanding of academics. By connecting both academic and technical knowledge to real-world applications, these programs often succeed where the conventional academic curriculum often fails—in engaging students and giving meaning to learning. Rather than being a deterrent to higher academic achievement, such programs may, in fact, be key to ensuring that more students meet higher academic standards. Consequently, these programs need as much support as they can get, especially in the form of qualified teachers who can effectively bring rich and challenging CTE curricula to life. There are, however, several obstacles.

One problem is there are fewer university programs to prepare CTE teachers today than there were in the 1980s, when *A Nation at Risk*¹ served as a call to arms for the education policy community. And many of the programs that remain are still preparing teachers for the “old” vocational education, which too often has been perceived as a holding area for low achievers who have no aspirations beyond maybe a high school

¹National Commission on Excellence in Education. (1983). *A Nation at Risk: The Imperative for Educational Reform*. Washington, DC: Author.

diploma or a credential for an entry-level job. Because these programs emphasize rather narrow, occupationally specific training for sub-baccalaureate employment, they pay little attention to advanced technical instruction or teaching key aspects of challenging academics.

Yet another important issue is teacher supply. The new decade will witness a rise in both high school enrollment and teacher retirements. Grades 9–12 enrollments in public schools are projected to increase by 4.2 percent between now and 2010, and the number of secondary school teachers needed during this same period is expected to increase by 78,000, or 6.8 percent.² At the same time, the baby boom generation, which constitutes a significant share of the teaching force, is aging and retiring. Their departure will further heighten the demand for new teachers. According to a recent RAND study,³ CTE teachers are, on average, significantly older than non-CTE teachers, which suggests the press to fill CTE teaching positions will be even greater. These facts have led many to conclude that public officials should pay more attention to ensuring a pipeline of well-prepared CTE teachers.

The good news is that career and technical education can point to successful programs throughout the country. Some programs are thriving, including those that are directly connected to a healthy sector of the U.S. economy, such as technology. There are schools and programs at all education levels led by excellent teachers who are keeping career and technical education vibrant and relevant. They are joining with other educators and institutions inside and outside career and technical education. They are rethinking the content and structure of university teacher education programs in the interest of preparing well-qualified teachers. They are providing resources and professional development to support teachers. And many others in career and technical education want to do similar things. Preserving and aiding the strong CTE programs and improving others, however, will require a significant commitment to curriculum development, professional development, and the preparation of new teachers according to high-quality CTE standards.

²Gerald, D., and Hussar, W. (2000). *Projections of Education Statistics to 2010* (NCES 2000-071). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

³Gaurino, C., Brewer, D., and Hove, A. (2000). *Who's Teaching, and Who Will Teach. Vocational Education?* Santa Monica, CA and Berkeley, CA: RAND and National Center for Research in Vocational Education.

To jump-start this important conversation about teacher quality, and to explore how the federal government might be of assistance, the U.S. Department of Education's Office of Vocational and Adult Education (OVAE) called a meeting in June 2000 to examine the current state of teacher education in the field of career and technical education. Over the course of two days, more than 200 higher education faculty, high school teachers and administrators, and other public officials gathered in Washington, DC, to exchange ideas about the preparation and continuing education of career and technical education teachers in the United States. Titled "Building a New Model," the symposium had an admittedly ambitious goal but this choice by OVAE was deliberate. OVAE has a strong interest in accelerating the conversation about quality teaching and determining the extent of consensus on questions like these:

- ▶ What qualities should accomplished CTE teachers possess?
- ▶ What are the characteristics that should define CTE teacher education programs?
- ▶ How well are university teacher education programs keeping up with career and technical education at the secondary level and preparing new teachers for a changing set of responsibilities?
- ▶ How might states, districts, and local schools improve their efforts to educate practicing CTE teachers?
- ▶ How can states and school districts build greater flexibility into their licensing systems to expand the pool of potential CTE teachers and continue to maintain necessary quality controls?

The discussion and debate, summarized on the following pages, was lively and informative. Participants told stories of innovative policies and practices in their own states, schools, and colleges and described a host of challenges that line the path between CTE teacher education today and the ideals they envision.

One of the biggest challenges, outside of such long-standing issues as teacher salary and status that apply to all teachers, is that the role of career and technical education in U.S. secondary schools is no longer clearly defined. For much of the past century, it was the path for students heading for the workforce—for example, to jobs in such fields as auto repair or construction—directly after high school. College generally wasn't part of the picture.

Now things are changing. Especially in the past decade, career and technical education has been in flux. Schools have been steering away from forcing students to decide between a route that leads to immediate entry into the workforce or one that leads directly to college, particularly when so many of today's jobs require at least two years of postsecondary education. The current thinking is that all students, regardless of their course concentration in high school, should be held to rigorous academic standards so they are prepared for further education and careers.

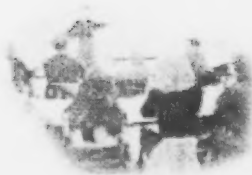
Encouraged by the federal government, many states and districts are trying to move career and technical education in a new direction. They are introducing more academics into their courses and holding students to state academic and industry performance standards. They are organizing CTE programs according to broad career majors rather than narrowly defined jobs. They are working with their postsecondary counterparts to ensure that CTE students are prepared for college and further education. And they are adopting different instructional methods, such as project-based learning, that also require new thinking about the way student progress is assessed.

The success of those efforts still depends primarily on teachers. Reform ideas are just ink on paper if teachers on the front line are not properly prepared to implement them.

This symposium was a first step in a series of initiatives that OVAE has planned to help states, universities, and local education agencies advance quality teaching initiatives in career and technical education. Participants agreed broadly on the kind and quality of education that should be offered, although they were less united on the best strategies to achieve the vision. They also highlighted current areas of weakness in both preservice and inservice education and proposed some solutions.

The following pages attempt to capture the flavor of the debate surrounding initial CTE teacher preparation and ongoing inservice education that emerged during this symposium. Also featured in this report are thumbnail sketches of five of the several promising programs that made presentations at the symposium.

The Big Picture: Opening Addresses



EDUCATING CAREER AND TECHNICAL EDUCATION TEACHERS: THE CHALLENGES AHEAD

*Patricia W. McNeil
Assistant Secretary for Vocational and Adult Education
U.S. Department of Education*

We're meeting at a time when the state of the high school is in flux. The challenge of changing high schools is great—and it is urgent. We're asking ourselves what the purpose of high school should be and how high schools should be organized to accomplish that purpose.

Within the high school, the role of vocational education used to be clear and straightforward: we take certain students and prepare them for jobs in agriculture, the service industries, building trades, etc. But today's emphasis on knowledge, information technology, and globalization puts a premium on flexible workers with a high level of intellectual skill. And that's forcing us to move from a model in which the best vocational education was grounded in entry-level jobs with specific skills to a model in which the best vocational education is grounded in a general education in how to use one's mind well. Having the preparation and flexibility to advance in a career and change careers . . . is the new imperative.

We're really being forced to examine whether career and technical education, particularly at the secondary level, is a means to an end, is an end in itself, or is both.

We have new performance measures in federal legislation that require students who take technical coursework to meet the same academic requirements as all other students. The performance measures track entrance into and completion of postsec-

ondary education. In partnership with states, we've just developed 16 new career clusters that now cover virtually all jobs in the economy and envision career pathways that don't necessarily stop with a certificate or an associate's degree.

Now, there are some who totally reject the idea of having *any* career and technical education in the secondary curriculum. And there are others in our field who think the historic role of preparing people for entry-level jobs should remain our key focus. At this symposium we're not going to spotlight either end of the policy spectrum. Rather, we want to focus on a new vision of career and technical education and how to prepare a new kind of teacher for that role.

► ► ► *This new vision of career and technical education offers leading-edge teaching and learning and provides students with a rock-solid foundation for further education, for citizenship, and for success in the world of work—and doesn't compromise anyone's future choices.*

This new vision of career and technical education offers leading-edge teaching and learning and provides students with a rock-solid foundation for further education, for citizenship, and for success in the world of work—and doesn't compromise anyone's future choices. This vision is also tightly linked to the academic knowledge and skills students need if they're going to have a future with a purpose. Strong career and technical education not only can give students a sense of what careers might be personally fulfilling, but by bringing the workplace into the classroom and vice versa, it can provide, in the hands of the right teacher, almost unparalleled opportunities for learning.

The Department of Education, and Secretary [Richard] Riley in particular, have put a lot of emphasis on how we prepare our teachers for the future. Most of the work we've done on teacher preparation and professional development has been focused on the entirety of elementary and secondary education. What

we've found is the principles and precepts of career and technical education, particularly contextual teaching and learning, are valuable and really necessary if we're going to educate all students for high standards. But the leap from theory to action has been slow in coming, so we still have a lot of work to do.

There does appear to be an emerging consensus on teachers' education for the future. First of all, they've got to be grounded in their subject area. They need to be well versed in learning theory and in putting that theory into practice. They've got to be experienced in classroom management. They have to be focused on student learning and achievement, and they have to be skilled in how to engage a wide range of students in learning.

These characteristics are basic, regardless of what is taught. But career and technical education teachers require an additional set of competencies. First of all, they need a solid grounding in the academic foundation of their field. Second, of course, they need specific industry knowledge and skills. They also need an understanding of basic labor market and workplace readiness skills. They need to know how to form industry partnerships because they've got to keep up with the innovations in their field. They need to be able to arrange internships for young people, and they have to understand what's best taught in the classroom and what's best learned on the job. They need practical experience in industry as well as in the classroom. They need to know how to work with academic teachers and how to incorporate academic standards into technical coursework.

So, where are we going to find these super men and women? What we want is a lot to ask for, and it's so much different from what we have traditionally looked for in the past.

What are the most promising approaches to recruit and prepare new teachers for our field? How are we going to pay them what they're worth? What is the best way to move someone from industry expert to effective teacher? How can we transform the practice of experienced teachers, which is often too narrowly focused on building skills for entry-level jobs rather than on building knowledge and understanding that students need to pursue education and jobs with career ladders? How can we use distance learning to enhance classroom instruction and professional development? How can we improve clinical practice so that our teachers regularly keep up with the changes in the industry? How can we develop systematic approaches to professional development outside of the one-stop workshop approach?

That's why we invited you here. That's what this symposium is designed to do—put us on the road to being much more thoughtful and systematic in our thinking about how we prepare our teachers for the future.

Above all, we want you to keep one idea paramount: career and technical education teachers need to hold the highest expectations for their students. For too long, stu-

dents and the public in general have been ill served by a conspiracy of low expectations. Career and technical education is all too often cast as second class. We know it's not, and we know it shouldn't be. But if the perception and the reality are going to change, as they should, we must build the capacity of the teaching force to make learning come alive for all of our students and ensure that all of them leave high school ready and able to fulfill their dreams.



PREPARING TEACHERS FOR THE CHALLENGE OF EDUCATION IN THE NEXT CENTURY: SCIENCE AS A CORE SUBJECT

*Bruce Alberts
President
National Academy of Sciences*

We need to think differently about education. Today is a time of rapid change, and we are just at the beginning of a new computer and telecommunications revolution. Eventually the transformation of our society, wherever it ends up, will be as great as the Industrial Revolution was for an agrarian society. The upshot for teachers is that we need to prepare all of our people to think for a living.

The problem has been well posed in a book by the same title, called *Thinking for a Living*, by Ray Marshall and Marc Tucker:⁴

Fifty years ago most workers were expected to go to work and do what their boss told them to do. School was and continues to be much the same even though teamwork is what counts in the workplace and self-governing people are much more valuable than those who wait to be told what to do next. . . . Schools still try to cover the whole terrain of all the major subjects as if students will never again have the opportunity to study any of these things, thereby sacrificing the kind of real understanding of any of them that is required for continued learning.

⁴Marshall, R., and Tucker, M. (1992) *Thinking for a Living*. New York: Basic Books.

How do we provide an education that prepares students for the world of tomorrow? Increasingly, science and technology will dominate our society. Since I am the president of the National Academy of Sciences, you won't be surprised if I begin my talk with a few words about science and what it brings to our society.

Science tells us that the world is a rational place. Newton's laws have allowed us to send a space vehicle to Mars. And in my field of biology, science has led us to an amazing understanding of how cells and organisms work, and it has brought great improvements in medicine that make our lives more predictable. More generally, science has helped to remove the fear in our lives.

Science also allows us to have a deeper appreciation of the beauty and elegance of the world. The physicist Richard Feynman put it eloquently:

The world looks so different after learning science. For example, trees are made of air primarily. When they are burned, they go back to air, and in the flaming heat is released the flaming heat of the sun, which was bound in to convert the air into tree. And in the ash is the small remnant of the part that did not come from air, that came from the solid earth instead. These things are beautiful things, and the content of science is wonderfully full of them.

Science brings us important values. You can't do science in a community or nation that does not allow creative expression, or in a nation in which who says something is more important than what is said. When you think about schooling, this is one of the most important benefits we can hope to achieve from teaching science: tolerance for a wide range of ideas, but with an insistence that there be evidence presented for one's views about the natural world.

The bad news is that many people see science as creating great changes they have trouble coping with. This alienation may help to explain why there's still so much mysticism in the world, and it may also explain why the people of Kansas have apparently decided that students do not need to know that the Earth is more than 10,000 years old. Carl Sagan pointed out in his last book that science serves as a candle in the dark. It's our best bunk detector. How do you decipher truth from falsehood? More than ever, the future of society depends on people who can make wise decisions. If we

spend our limited resources protecting ourselves from false dangers, there will not be enough resources to protect against the real ones.

The mission of the National Academy of Sciences is to bring science to the people. We've always had a special relationship with the federal government because our charter, established by President Lincoln, required that we investigate scientific issues for them when-

► ► ► *If we teach subjects as a bunch of words, a fusillade of information, teachers won't know what we mean when we say we should teach science as inquiry.*

ever called upon. In 1991, we had the very difficult task of developing national science education standards for K-12 schools. What we have come up with is a framework for the next 10 years that involves three core ideas: science must become a core subject in every year of school; science should be for all students; and science should be taught as inquiry-based learning. Classes should be noisy and interactive. Students should be exploring what is and is not evidence, not memorizing words in a textbook. This is happening to some extent in elementary science classes, but what we need is a much better curriculum for middle schools and high schools.

I was asked to review a 500-page, seventh-grade life sciences book from cover to cover. Millions of kids are using it. I didn't know how bad science education could be until I read it.

It covered all of biology just like high school and just like college, but it was worse because all these science words were crammed into such a small space.

The real problem is colleges and universities. High school biology teachers cannot teach according to the National Science Education Standards or about anything in depth when all they are doing is trying to get kids into colleges. That's what the parents in many school districts are worried about. They want to make sure teachers are teaching all those words on the SAT test.

Everybody blames someone else for the problems in student achievement in science—it's the unions' fault, it's the parents' fault. But clearly it all starts with the faculties of arts and sciences in college because when we teach those who become teachers of science, we don't know what we're doing. Teachers teach the way they're taught. If we teach subjects as a bunch of words, a fusillade of information, teachers won't know what we mean when we say we should teach science as inquiry.

The science standards stress that we need to make the world of the K-12 teacher highly visible on campus. We need to align university admissions policies with the standards. And we need to teach all of our introductory courses the way science should be taught, emphasizing inquiry and imparting a real understanding of the nature of science. We should not have cookbook labs. And we should introduce institutional rewards for science faculty who initiate and support exciting and innovative programs in K-12 education.

How do we get people who understand science into teaching science as a career? We need to reach out directly to students and create a different pipeline. The way we used to teach science when I was a young Princeton professor was to focus on the students who we thought might become good professors, while encouraging all the others to switch to other majors. This is a terrible attitude, and I feel bad about the fact that I did not challenge it at the time. Instead, we must encourage those students who want to learn science for all kinds of reasons.

We also need a much better connection between the science, engineering, and technology communities. Only after coming to the Academy did I understand the fundamental relationships. Science uses existing knowledge to discover new knowledge about how nature works, and the methods are based on inquiry. Technology uses existing knowledge to create new devices and improve the human condition, and the methods are based on design.

We are preparing a technology supplement to the science standards. In addition, the National Academy of Engineering recently collaborated with the International Technology Education Association to produce the first-ever national standards for technological literacy (available at: www.itea.org). This is a first step toward bringing these worlds together.

Our hope is that the technology education groups and the National Academies will get to know each other better. Then we can change the education system in profound ways and make it possible for every child to have the same opportunity to succeed in this very exciting, dramatic time we are living in.

In summary, career and technical education teachers should be talking with their colleagues in the arts and sciences to ensure that our children get enough science. We

need to engage all students in more projects and real-life investigations and reduce the number of survey courses and textbooks. We need to change kids' attitudes of what the world is like, and that means guiding them to a place where they can make their own discoveries. Then they'll be people who are ready for the world of work.

Reports on science issues and guides for teachers, parents, and students are available on the National Academies Web site: www.national-academies.org

A 21st-Century Vision of Career and Technical Education



It is difficult to "build a new model" of career and technical teacher education that is defensible without first attempting to decide where career and technical education itself ought to be headed. Symposium participants reached no clear consensus on a comprehensive "vision" of career and technical education, but they generally agreed on several key principles about its form, content, and purpose and the key challenges now confronting the field.

The biggest hurdle, participants noted, is the American public's image of career and technical education, which has been suffering an identity crisis for many years despite the fact that there are excellent CTE programs scattered around the country. While CTE's content and delivery vary from place to place, many Americans view it as a form of education that limits options for young people even as surveys show that parents support a rich educational experience for their children that includes preparation for careers.

In recent years, some CTE programs have changed in response to demands of the economy, new state academic standards and assessments, and reforms such as "career clusters" that integrate academic and technical education. Still, these changes have been sporadic at best, and in some schools career and technical education remains a pathway to specific, narrowly gauged jobs. Generally, the public's perception is that career and technical education sets low expectations for its students and does not advance their understanding of the core academics they need to succeed in the modern labor market.

How can and should career and technical education change and alter an image that many educators would agree is accurate? A first step, participants suggested, would be

to ensure that all programs model the best aspects of career and technical education, including the following:

- ▶ demanding academic and technical content that involves both the hand and the mind;
- ▶ connections with business and industry that ground instruction in reality;
- ▶ certification programs that lead to job opportunities for students, celebrate completion, and build self-confidence;
- ▶ applied learning methods that engage students in hands-on projects;
- ▶ accessibility for all students, no matter their preferred approach to learning; and
- ▶ opportunities to learn both in the classroom and in the workplace.

For the most part, symposium participants also seemed to agree that more CTE programs should strive to add qualities like these:

- ▶ inclusion of strong, relevant academic content that is tied to the technical field;
- ▶ an emphasis on broad career fields rather than specific jobs; and
- ▶ an expectation that all students may at some point in their lives have an interest in attending college and need to learn higher-level academics.

With those objectives in mind, the participants identified the following implications for strengthening CTE teacher education (mostly understood to mean college- and university-based initial preparation):

- ▶ Standards should be developed for preservice programs.
- ▶ Teacher educators need to provide their students with more clinical experiences in schools and the community.
- ▶ CTE faculty and their teacher education curriculum need to build closer working relationships with other faculty on campus.
- ▶ College and university faculty should make greater use of portfolios and project-based learning—the same methods they expect high school teachers to use.

Participants also agreed that schools need to address certain issues that frequently crop up and sometimes serve as a brake on CTE improvement, such as these:

- ▶ Four promising approaches to instruction—contextual teaching and learning, integrated curricula, problem-based learning, and inquiry-based learning—pose special challenges to all teachers, whether CTE or academic, but they rarely get the help they need within their high schools, or from their teacher education programs, to rethink and revise their approach to instruction.

- ▶ Schools are better at teaching content than process. That is, they tend to stress the "what" of a subject (science facts and theory) rather than the "how" (what is the basis for the theory and its implications for the natural and man-made world, and how might it be challenged?).
- ▶ CTE curricula need to recognize that some students will continue to choose to enter the labor force immediately upon graduation from high school.
- ▶ High school scheduling remains a problem, especially for those who want to cover fewer subjects in more depth within longer class periods.
- ▶ Parents need to be better informed about the value of career and technical education.
- ▶ The goal to raise standards and construct programs so that all CTE students can pursue a bachelor's degree is desirable, but programs also need flexible entry and exit points with intermediate stops that allow students to earn a certificate or associate's degree. Such a structure serves to acknowledge student accomplishments and recognizes that many jobs do not require a bachelor's degree.

These issues are complex and sometimes divisive, and symposium participants did not expect to resolve them in two days' time. Nonetheless, the meeting did provide an opportunity to discuss and debate some of those issues, including the role of academics in career and technical education, the structuring of teacher education programs, how best to connect instruction to the work world, and the purpose of career and technical education.

Academics in Career and Technical Education

If there's a dividing line in career and technical education, it is academics. On one end of the continuum are vocational educators who view academics as someone else's responsibility, while theirs is technical instruction. At the other end of the continuum are educators who view career and technical education as one of several legitimate pathways to postsecondary education and careers and see academic instruction as vitally important to that goal. Those in the middle think academics are important, but they are not as certain how much science, mathematics, English, history, and social science CTE students need, or what degree of responsibility career and technical education teachers should assume for teaching this subject matter.

In a panel discussion Larry Rosenstock, chief executive officer of San Diego's new High Tech High, stressed that the importance of introducing more academics into career and technical education goes beyond simply beefing up the curriculum to satisfy employers or school boards. It also helps to end the practice of relegating low-achieving students to CTE programs that are not especially demanding, he asserted.

"At High Tech High we are trying to get teachers to see their mission as joined," Rosenstock said. "Team-teaching, applied learning, experiential learning, project-based learning that's performance assessed—all of these things are important components of vocational education. I hire faculty who are both academically and technically proficient."

Other participants, while not disagreeing with the need for stronger academic content, reminded their colleagues that CTE courses typically are elective. "So then we have to ask ourselves why students select CTE," said Kenneth Gray, a Penn State University professor. "We may be moving toward universal postsecondary education,

but we are not there yet. That won't happen unless it is mandatory and free. So what happens to those who aspire to go to work? We can't lose sight of the fact that some students still want to go to work [right after high school]."

► ► ► *If there's a dividing line in career and technical education, it is academics.*

June Atkinson, director of the Division of Instructional Services for the North Carolina Department of Public Instruction, clarified that perspective. She agreed schools should assist in preparing students for careers, but their pathways "must include multiple entry and exit points" so high school graduates can re-enter the education system with

ease at any time if they decide to work before enrolling in college. That means CTE students need the academic preparation required for admission to postsecondary education.

Currently, however, a growing number of CTE programs appear not to be including much core academic instruction. Gene Bottoms, director of the Southern Regional Education Board's *High Schools That Work* consortium, introduced data showing that students in their 800+ school network tend to think CTE teachers do a good job of meeting vocational standards but don't focus much on academics. He also said high school CTE teachers and administrators often are concerned that if they raise standards, enrollment will drop because they underestimate what their students can accomplish. In addition, most CTE courses are exempt from state accountability standards, and half of CTE teachers lack the kind of academic base necessary to design challenging courses that integrate academic and technical content, Bottoms said.

Another challenge is that the expectations for academic and career and technical education will inevitably vary. For example, writing may mean one thing to an English

teacher and another to a CTE teacher. Participants agreed that schools should not expect CTE teachers to become experts in teaching the full academic curriculum. An automotive technology instructor would not teach a grammar lesson per se, but that teacher should be able to ensure that students practice and learn the type of writing an automotive technician might do in a shop, such as a parts order or memo to a supervisor. Instructors should be competent enough in English to critique those assignments and offer appropriate guidance.

The bottom line is that CTE students should have the opportunity in high school to learn and experience the same demanding academic subject matter that is presented to other students. In addition, this opportunity should not be confined to traditional academic classes but be present in CTE classes as well. This approach would increase the odds that CTE students will develop deep understanding of the big ideas in the core academic disciplines because they will have had the chance to work with these concepts in real-world applications. Similarly, CTE teachers who are able to integrate demanding academics into their courses will have removed a key obstacle that often keeps college-prep students from enrolling in their classes—an option that might prove especially valuable to both their intellectual and social development.

This push for demanding academics is a concern for all students, not just CTE students. As Bruce Alberts asserted in his opening address, the high school curriculum suffers from being a mile wide and an inch deep, and survey courses are as much a problem on college campuses as they are in high schools. There are at least three major reasons for his and others' preference for more in-depth studies across the curriculum, whether the subject is academic or technical. First is the realization that real command of challenging subject matter requires that students have sufficient time to struggle with important ideas and examine them from several angles. Second is to ensure that teachers spend enough time in this manner on the most important subjects students need to learn. Third is the notion that such work is more engaging and rewarding for students on several levels. Alberts made this point well when he spoke of a lesson he learned from working with graduate students: when they are not just lectured to and are given the time to become problem solvers, they gain confidence

► ► ► *College and university faculty should make greater use of portfolios and project-based learning—the same methods they expect high school teachers to use.*

in their own ability to succeed at inquiry, and they gain confidence that they can successfully tackle the next problem they encounter.

Career Clusters

One way to address the challenge of incorporating more rigorous academics into career and technical education is to reorganize courses around career clusters or majors. Such curricula are designed to provide a tightly aligned, comprehensive, and well-integrated set of academic and technical courses built around a particular field or industry such as information technology. This structure can give students a broad grounding in a major sector of the economy and build in rich doses of the core academics that are the necessary building blocks for a promising career in a particular industry. So, for example, a student in a health care cluster would learn about and have assignments built around a range of jobs in the field—from medical technician to physician—and be held to the same high mathematics and science standards as a student in a standard college-bound program.

The U.S. Department of Education has established 16 career cluster models⁵ that introduce students to entry- through professional-level occupations in a broad industry area. Industry coalitions are now specifying the academic and technical knowledge and skills needed for further education and a career in each field for the first five clusters, and the Department will soon award grants for developing the remaining 11 clusters.

Scott Hess, U.S. Department of Education program specialist, led a discussion about how the Department's career cluster initiative might affect teacher education. Audience members made these points in the course of the discussion:

- ▶ The cluster concept helps counselors and academic teachers focus students not only on college but also on what their potential college major might be.
- ▶ Career clusters, coupled with standards, can help educators move away from an "us" versus "them" (CTE versus academic) mentality.

⁵Agriculture and natural resources; arts, audiovideo technology, and communications; business and administrative services; construction; education and training; financial services; health science; hospitality and tourism; human services; information technology services; legal and protective services; manufacturing; public administration and government; retail/wholesale sales and service; scientific research, engineering, and technical services; and transportation, distribution, and logistics services.

- Federal officials must strongly push initiatives such as career clusters or schools are likely to ignore them.

One advantage of this model is that it can serve as a platform to develop industry expertise among academic teachers. While all schools may not have sufficient numbers of faculty to make this happen, Vicki Lukich of David Douglas High School in Portland, Oregon, discussed how her school made the necessary investments in staff development to build teacher capacity along these lines. This effort included having academic teachers spend time with local companies to gain an appreciation of the knowledge and skills that are paramount at both the entry level and beyond in a given industry.

Connecting Instruction to the Work World

Participants agreed that one of career and technical education's great strengths is its focus on teaching and learning in context—making students aware of how particular skills and knowledge are applied in "real life." Technology teacher Roy Kimmins of High Point, North Carolina, offered a unique perspective on this point because he had spent many years as a high school biology instructor. He explained that his prior experience teaching to advanced placement tests didn't allow him the room he now has to teach a subject in context and in-depth, "and it left me unsure of what my students actually learned."

Nancy Knapp of the University of Georgia's College of Education suggested these principles ought to characterize CTE courses:

Students are actively engaged in constructing knowledge and solving complex problems. They learn in multiple contexts, and they learn from one another through cooperation, discourse, teamwork, and shared reflection. Whenever possible, their learning activities have an authentic purpose beyond the school context.

Knapp sometimes asks her students to write about a time when they were asked to do something in school that was useful to someone. "Most can't think of anything; they say that they 'just read textbooks.'"

Contextual teaching and learning (CTL) shouldn't be confined to the CTE community—or even the teacher education community—Knapp stressed. The CTL project she directs at the University of Georgia includes science, history, and mathematics faculty as well as occupational studies faculty. Students in the CTL project take a service learning course and some learning theory courses that are not required of others in the teacher education program.

To better understand how to link instruction with the work world, the CTL students at the University of Georgia intern with local businesses in the summer or during the school year. University faculty also spend three days each year touring businesses and may get release time for internships.

Knapp said CTL students rate the class highly and show more confidence in their teaching abilities than those who have not had this kind of experience. They also were able to give far more realistic, detailed examples of real-life applications for academics having had the opportunity to observe work settings where what they were studying in college came to life.

There was strong sentiment that close collaboration with the arts and sciences faculty is key to the success of contextual teaching and learning, but both academic and CTE teacher educators must be willing to change how and what they teach. They also must make an effort to overcome a traditional mind-set that isolates disciplines and relegates colleges of education to the bottom of the university ladder. "Working with teacher education carries little prestige and few rewards in many departments," Knapp noted.

Research shows that teachers teach the way they were taught. So if education students are exposed to contextual teaching and learning in college, they will be more likely to use those methods when they lead their own classrooms.

Participants offered these suggestions for how postsecondary institutions might help advance contextual teaching and learning:

- ▶ provide release time for faculty or summer pay for course design and redesign;
- ▶ arrange for faculty leave so they can work in other settings;
- ▶ allocate resources for integrated teaching institutes in the summer;
- ▶ value cross-department collaboration and community service and evaluate faculty involvement in those efforts; and
- ▶ reward and encourage excellent teaching, not just the publication of research.

One of the difficulties in implementing contextual teaching strategies is that they are often team-oriented and such projects take more time to plan and carry out. "The complaints about contextual teaching and learning are that it takes too long, doesn't cover enough, and you can't crank 700 students through it," a participant explained, referring to textbook-based survey courses that cover a wide terrain but explore only surface features of the landscape.

Knapp recommended that the U.S. Department of Education support more research that provides evidence that contextual teaching and learning provokes learning in ways that traditional textbook-based teaching cannot.

Long-Term Objectives

The mission of a college-prep curriculum is clear—prepare students for admission to four-year postsecondary institutions. The goal of CTE used to be preparing students for entry into jobs right after high school, but the field has moved away from this narrow goal in recent times as the economy has evolved. Research shows earning power for those with college degrees continues to increase in relation to those with only a high school diploma. Since many technical industries have certification standards that require at least a two-year degree, students who don't prepare for college have fewer job options today.

Still, the CTE field has struggled to define its higher academic goals and often sees a conflict between this objective and its historical mission to serve at-risk students and others who want to work immediately after high school. Some have argued that narrowly focused skills training remains valuable and yields employable high school graduates, but others claim education in broader industry fields can yield the same result without compromising students' futures. Others take this a step further. They argue for a full-fledged merger of college-prep and career and technical education, seeing it as sound from an educational perspective as well as from a social perspective. This latter view rests on such a merger serving as a means to end the segregation of students by social class that is too often a byproduct of the current programmatic divisions in the nation's high schools.

► ► ► *One advantage of the career cluster model is that it can serve as a platform to develop industry expertise among academic teachers.*

Regardless of the structure, participants agreed it is best to design CTE curriculum and instruction so students are prepared to work after high school even if they choose to take

some postsecondary courses, delay college entrance for a few years, or apply for admission to college right after high school. As for its work with at-risk populations, the prevailing view was that career and technical education can be proud of its successes in this arena and, concurrently, strive to provide a demanding curriculum for such students.

► ► ► *The bottom line is that CTE students should have the opportunity in high school to learn and experience the same demanding academic subject matter that is presented to other students.*

Barbara Roche, executive director of the Regional Education & Business Alliance in western Massachusetts, noted that her sister became an auto mechanic after she enrolled in high school CTE courses. "I don't know where she would have ended up if that shop teacher hadn't pulled her in from the doorway," said Roche, who explained that her sister's dyslexia gave

her trouble in traditional academic courses. At the same time, she believes her sister has limited her earning potential because she did not earn a four-year college degree.

"Career and technical education should be about opening up options, not foreclosing them," Roche said.



Recommended Federal Actions

One aim of the symposium was to gather advice about what the U.S. Department of Education might do to improve CTE teacher education—initiatives it might develop, existing practices it should consider changing, or efforts to which it could lend support. The participants were quite forthcoming and offered a range of opinions, the most prominent of which are presented at the end of each section in these proceedings. It should be noted, however, that many of the recommendations apply with equal force to state and local education agencies, colleges and universities, and foundations and community groups. So these are suggestions for consideration by the U.S. Department of Education and others, not official Department positions.

The recommendations participants offered for achieving a new vision for CTE teacher education were as follows:

- ▶ Support national standards for CTE teacher education.
- ▶ Promote greater flexibility in state licensing while preserving the states' continuing quality assurance function.
- ▶ Support programs that prepare CTE teachers to take responsibility for student development in the core academic disciplines.
- ▶ Focus on exemplary practices and disseminating information about them.
- ▶ Reinstate a Teacher Corps program that could be especially effective in recruiting and preparing mid-career people interested in teaching.

The Content and Structure of CTE Teacher Education



What Teachers Should Know and Be Able to Do

"It is no longer debatable that CTE teachers need to teach academic concepts," said Professor Kenneth Gray of Penn State University during a panel session. "Without good academic skills, students cannot master technical skills. And over half of young people coming out of high school go to postsecondary schools. Their success there is going to depend on [their command of] academic skills."

The new vision of career and technical education articulated by many symposium participants requires well-rounded teachers who can join technical savvy with academic knowledge and skills. This is a departure from the historical view that a vocational teacher's technical knowledge and skills were most important, and academic knowledge was a distant second.

Because this historical view has guided career and technical education over the years, it is not surprising that symposium participants—while agreeing generally with the abstract concept that the field should move toward embracing more academic content—were less definitive about just what this means.

Adria Steinberg of Jobs for the Future brought the issue into sharp relief during her session on "command of the core academic disciplines." She presented four statements that expressed somewhat different qualities for a CTE teacher to have and randomly split the attendees into four groups to defend each of them. The statements were as follows:

1. A solid grasp of industry skills
2. The equivalent of a master's degree in the academic area associated with their field
3. A mix of basic industry skills and a strong grounding in the SCANS (general workplace) skills
4. Some industry experience and a minor in the academic area associated with their field

► ► ► *The new vision of career and technical education articulated by many symposium participants requires well-rounded teachers who can join technical savvy with academic knowledge and skills.*

Members of the group assigned to defend statement #2 were so opposed to the notion that they had difficulty treating the exercise seriously. After the members of the group assigned to defend statement #1 gave their rationale, many in the room gave them hearty applause. Only after a lengthy discussion and airing of all the arguments did most of the participants come around to some agreement that among these artificial choices, statement #3—a mix of industry skills and grounding in SCANS—might be the closest approximation of the highest-priority qualities for CTE teachers.

At the same time, the participants voiced their belief that academic teachers need to move the emphasis of their instruction from theory to practice and from passive to active learning. For them, this means understanding how academics are applied in and out of school—in the community, home, and business and industry. Overall, the prevailing view was that the CTE com-

munity clearly needs to accept some measure of responsibility for strengthening the academic content of its own courses while continuing to push for more practical applications in academic courses.

This debate served to highlight how difficult it is to define the qualifications of a CTE teacher, especially at a time when there is pressure to keep expectations modest because many categories of teaching are in short supply in many areas of the country.

Bottoms of SREB said data from *High Schools That Work (HSTW)* studies show that half of vocational teachers teach in way that challenges students to apply vocational concepts integrated with academic knowledge and standards, so there is movement in this arena. Still, even in schools like the *HSTW* sites where there is a commitment to integrated instruction, there is a good distance to go in reaching this objective.

Professor Kenneth Welty of the University of Wisconsin-Stout put it this way: "There are people in our field who assume that it is enough for career and technical teachers to possess technical knowledge and skill." Though he clearly disagreed with that point of view, Welty said these traditionalists sometimes see teacher educators who push for CTE teachers to be academically competent, to teach using an inquiry model, and to employ a variety of assessment methods as sell-outs who are abandoning the "real" purpose of CTE.

Based on the comments of symposium participants during the two days, these were the qualities of CTE teachers around which there was some agreement:

- ▶ fairly specific technical knowledge in a particular industry, though there was debate over how broad or narrow this ought to be;
- ▶ the ability to develop in students the capacity to learn at least selected aspects of the core academic disciplines;
- ▶ the ability to help students learn what are sometimes called the "SCANS skills"—teamwork, problem solving, understanding of systems, ability to communicate in a variety of ways; and
- ▶ a basic understanding of how students learn.

Some participants indicated they thought it was acceptable for people with industry experience, who most likely would possess the requisite technical knowledge, to begin teaching as long as they enrolled in education courses to develop these other skills. "We want trade experience first," said Todd Fields, assistant director of Westbrook Regional Vocational Center in Maine. "Then we help those people work on their degrees for teaching."

Ann Southworth, principal of Roger L. Putnam Vocational-Technical High School in Springfield, Massachusetts, said the quality she seeks first in new teachers is a clear interest in helping children. "You would be surprised at how many teachers there are out there who just do not like young people and don't really care about helping them," she said. "Secondarily, I look for the knowledge base and the pedagogy, but you need the right philosophy first. We can work on the rest later."

Determining what an accomplished CTE teacher should know and be able to do provided the symposium participants with a frame of reference for improving teacher education—from initial preparation through induction and quality assurance.



PROMISING PRACTICES: A Symposium Profile

Preparing Experienced Teachers for New Standards

Sometimes all it takes to set a failing school on the right path is a little faith and investment in its teachers.

Ask Ann Southworth, a Massachusetts assistant superintendent who took the leadership reins of Roger L. Putnam Vocational-Technical High School six years ago. When she arrived on the scene, youth gangs ruled the school, which was so hobbled that it was in danger of losing its accreditation. Eighty percent of Putnam's 1,500 students live in poverty, and many are non-native English speakers. Southworth had to decide whether to close the school or transform it. She opted for the latter, pushing to

- get control of the school;
- involve business partners in the community to hold the school to standards; and
- create a strategic plan in conjunction with the entire community.

"Our mantra was 'educate for understanding and train for implementation,' which means we need to continually define who we are and where we are going," she said.

After Southworth restored order, she moved to the next priority: preparing teachers for the changes. A "total quality" professional development team guides the administration and staff. Faculty members receive seven full days of professional development each year, for which they are paid, and they have other opportunities for training after school and on weekends. Summer workshops address the school's ninth-grade transition program that readies new students for their college-prep curriculum. Other topics have included

- reading across the curriculum (including career and technical classes);
- improving students' self-discipline;
- using Putnam's employment curriculum;
- getting familiar with technical software for instruction;
- modeling research and presentation skills across the curriculum; and
- teaching study skills.

Southworth said many teachers who were not interested in changing their practice transferred or retired, but new and energetic staff who were committed to the new vision signed up. "It is very important for all faculty to pull together as a team to help the students because you can't do it if everyone is going in independent directions," she stressed. Putnam has adopted the principles of the Southern Regional Education Board's *High Schools That Work* consortium, which include teaming academic and vocational teachers, moving all students toward a more demanding academic curriculum, and carefully assessing student performance. The objective of teacher inservice, according to Southworth, is a "steady movement toward the vision."

For more information, contact Ann Southworth at 413-787-7426 and
High Schools That Work at www.sreb.org

Improving Initial Preparation

Traditionally, CTE teacher education has been structured around seven main subject areas: agriculture education, business education, consumer and life sciences (formerly home economics) education, health occupations education, marketing education, technical education, and trade and industrial education. Agriculture education programs often were, and often still are, part of schools of agriculture, while other programs typically have been housed in schools of education.

"People are so committed to that structure [the traditional education school model] because it permeates the colleges and universities," noted one participant. "But really it's been stifling. How can we break that apart? In California, there are fewer than 100 people in the traditional CTE teacher education pipeline. Yet we feel we have to keep this old system. Changing it is like pushing the rock up the mountain."

In this traditional structure, students in teacher education programs spend the better part of their first three years studying theory and often don't see the inside of a high school classroom, or interact with students, until their last year of college. There was a general feeling that CTE university faculty are too remote from the secondary schools for which they are preparing teachers and are typically not up-to-date on changes being implemented in the schools. So new teachers are not being prepared for leading-edge approaches such as career clusters or integrated curricula.

Larry Rosenstock, of San Diego's High Tech High, offered a harsh assessment: "Our feeling is that if teachers went to education school, they have been marched off in a direction different from where we want to see them headed."

A continuing issue is the integration of theory and practice. Though theoretical foundations are valuable, and not every concept has an immediate practical application, many teachers and teacher educators acknowledge that the gap has grown too large. Observed one participant: "University faculty don't value the experiential knowledge of teachers. They don't go out to schools to observe, and they don't reach out. When there's disagreement—if a student teacher says, 'But when I'm out in the school that's not what the teacher does,' the professor says, 'Well, he should.'" Sometimes this is a sound response, but not always.

Professional Development Schools

One outgrowth of the concern over the disconnect between the university and the classroom has been the increasing popularity of the professional development school (PDS). In this model, drawn from medicine's experience with teaching hospitals, teacher education students spend more time learning in a secondary school environment, and professors and the secondary-level teachers and administrators collaborate more closely.

For example, Maryland's Towson University has a PDS arrangement with Eastern Technical High School in Baltimore. Before their practicum, the teachers-in-training from Towson do an internship at Eastern Tech the week before school starts so they have a chance to observe how teachers and administrators prepare for the onslaught of students. Then they visit the school during opening day, and later they intern with a teacher and/or department to learn about the school program, personnel, students, and culture. All the while, they are learning educational theory from the university faculty.

This practice may become more common as secondary schools clamor for their new teachers to be better prepared. For example, Steve Godowsky, principal of Paul M. Hodgson Vocational-Technical High School in Newark, Delaware, has requested area universities to provide more internship experiences for education students because "we are having to do more and more of the training ourselves."

Richard Lynch, a University of Georgia education professor, is a believer in more, and earlier, field-based teaching experiences during initial preparation. Leading a discussion on the content and structure of CTE teacher education, Lynch offered these observations:

- ▶ A CTE faculty member and someone representing the appropriate academic content disciplines should supervise student teachers. Often large programs make a mistake when they hire retired teachers without experience in CTE to supervise student teachers.
- ▶ Field experiences should be tied to a related course or seminar.
- ▶ New teachers who come through a PDS model are more likely to stay in teaching than those who go through a traditional education program.



PROMISING PRACTICES: A Symposium Profile

Partners in Teacher Education: Eastern Technical High School and Towson University

At first, both the teachers at Baltimore's Eastern Technical High School and the professors at Towson University were skeptical about their new partnership. Both were joined in a pilot project in 1996-97 to test a professional development school (PDS) model that was essentially being forced on them by the state of Maryland.

In 1995, the Maryland Higher Education Commission mandated that every teacher candidate do an extensive internship in a PDS. The impetus was a desire to gradually familiarize teacher candidates with the workings of a secondary school rather than just drop them in a student-teaching experience toward the end of their college education.

After the pilot program, however, Towson University discovered that the 11 candidates in the PDS cohort were clearly more prepared than those in a control group, and many Eastern Tech teachers had become true believers. Noted one in an unsolicited letter to Towson faculty: "I've had three student teachers before from your regular program. None of these previous student teachers had the high degree of self confidence, management skills, or professional demeanor of this PDS intern."

The PDS program brings university faculty to Eastern Tech to provide on-site courses and seminars for both teacher candidates and experienced teachers. They also participate in school improvement and site-based research and serve on mentoring and assessment teams.

In their first semester, teacher candidates take a three-hour internship class at the high school one morning each week to learn about things like lesson planning, portfolio development, technology, discipline, and reflection. They get accustomed to the classroom and school culture by observing master teachers, participating in service projects, and attending management meetings. Their hands-on student teaching comes in the second semester, when they spend seven weeks each at a high school and at a middle school. By then they are more confident in their teaching because of their internships and camaraderie with fellow candidates.

The partnership also benefits experienced teachers and new teachers on provisional certificates, who can participate in the on-site courses and get a break on college tuition.

For more information, contact Robert Kemmery, Eastern Technical High School principal, or Margaret Johnson, site coordinator and assistant principal, at 410-887-0190; rkemmery@bcps.org and mjohnson@bcps.org

*Neubert, G. A., and Binko, J. B. (1998, February). Professional Development Schools—The Proof Is in Performance. *Educational Leadership*, 55(5), 44-46.

"The PDS model has student teachers in clinical assignments for longer than a normal student teaching assignment, so they are better prepared for what it means to be a teacher in a school—they're much more familiar with the culture," he said.

Whether adopting the PDS model or not, there was no disputing the reality that what has passed for clinical practice in the past has been woefully inadequate, and that one way or another colleges must find ways to build more robust and varied practicums for their student teachers.

Modeling Integration

Professional development schools bring education students into schools, but university faculty also need to guard against isolating themselves. Presenters and participants agreed they should model the kinds of collaboration expected of CTE teachers. This includes frequent interaction with educators at the secondary level, university colleagues in the arts and sciences and in other professional schools, and members of the business and industry community.

Prospective CTE teachers need this same exposure to the noneducation sectors of the economy. "We can ill afford to prepare career and technical education teachers who are unaware of the business and industry standards in their fields," said Jerry Tuchscherer, associate dean of the College of Education at the University of Idaho. He noted that his college is thinking about arranging internships for students not just in schools but also in their industry area.

Some reformers have gone so far as to suggest CTE teacher educators should not segregate themselves by subject area.

Like the agriculture model in many universities, the University of Wisconsin-Stout prepares technology education teachers in its technology school rather than in a separate school of education. This helps to bring career and technical education into the wider university conversations that help shape the higher education curriculum, said Howard Lee, dean of the University of Wisconsin-Stout's College of Technology, Engineering, and Management.

Kenneth Gray, director of the Workforce Education and Development program at Penn State, suggested it would be more efficient if universities had a single general

program to prepare CTE teachers instead of separate ones for specialties such as marketing and agriculture. To stimulate such a programmatic reorientation, Gray would have states offer a single license for CTE teachers rather than the several they now tend to have. "We need to become activists at the state level to change the [CTE licensing] requirements," he said.

Participants and presenters agreed on a more pragmatic objective that might fall short of some grander ideas: CTE teacher educators should try to find areas where their curricula intersect to create a focal point for injecting more rigor into the curriculum and collaborating with their colleagues in the arts and sciences. "Each area feels it is unique, that it is special and has much to offer. That's a credit to those professions. The question is, can we come to the table and find commonalities? Then we can use online education to deliver those competencies that all technical education teachers need," suggested June Atkinson, a member of the panel that discussed a new vision for career and technical education.

Cornell's College of Agriculture has taken a significant step toward getting education faculty to partner with other faculty by merging its math/science and agricultural education programs. Logistically the move made sense because the two programs were housed in the same building, explained Carol Conroy, who coordinates the agricultural teacher education program. But the attitudes of the two faculties were far apart. Over the past four years, the faculty have begun to collaborate and overcome the biases they felt toward each other.

Conroy said the shift was the direct outgrowth of a systemic reform initiative incorporating curriculum integration, standards, and methods. All education students at Cornell now take a core set of education psychology classes together, then fulfill other credits in methods courses that are more specific to each discipline.

Initially the math/science faculty, who outnumber the agriculture educators by about 2-1, figured they would subsume the agriculture program. But Conroy, who is a licensed science and agriculture instructor, worked hard to ensure that both sides understood what they could learn from each other. Agriculture educators helped their

► ► ► *More and more CTE teachers are choosing alternative routes to licensure, and states are not inclined to restrict them at a time when many schools are desperate for teachers.*



PROMISING PRACTICES: A Symposium Profile

Integrating Academic and Technical Teacher Education

Every work day, Cornell University teacher education faculty experience firsthand the benefits and challenges of curriculum integration. Four years ago, the university hired Carol Conroy, who is licensed to teach agriculture and biology/chemistry, to coordinate its agricultural education program. Part of her mission was to merge the program with Cornell's math and science teacher education program, which had been housed in the College of Agriculture for 20 years but had about as much connection to it as a landlord does to his tenants.

Initial reactions to the planned merger ranged from nonchalance to fear. "The science faculty is about twice as large, and many of them figured they would just absorb and subsume the agriculture faculty and students without having to make any changes to their program. And the ag ed faculty were worried they really would be overtaken," she recalled.

Instead, with the help of a four-year grant from the National Science Foundation, Conroy led an effort that created administrative efficiencies while preserving the integrity of both programs. No faculty positions were eliminated by the merger, and the two faculties that once regarded each other with indifference—or even downright condescension—are learning to respect each other. "At first it was clear that the science educators perceived the vocational people as less scholarly and less capable," Conroy said. "But the process of working with us has allowed them to see we may manifest our scholarship in a different way."

Cornell's Agricultural, Extension and Adult Education program offers one pedagogical sequence for its math, science, and agricultural education students. These courses address "generic" issues of teaching and learning. The program also offers methods courses that are specific to the subject areas. This fall, Conroy and one of her science education colleagues will team-teach an introductory methods course for all students in the program.

In the new system, Conroy says, both faculties benefit. Agriculture educators learn more about reflective teaching and inquiry, and the science/math faculty experience the importance of hands-on activities for students. Conroy recalls an instance when a biology student got a different perspective on physiology from an agriculture student who described how to graft a fruit tree. "It is wonderful for me when a physics student tells me he'll seek out the vocational instructors when he teaches," Conroy says. She offers an opinion on why there are so few examples of strong curriculum integration in high schools: "The problem is that people are 'trained' in a teacher education program, where there is not only a lack of ability for people to talk outside their discipline but a lack of understanding of how to make [integration] work. This opportunity to work together has shown people who may have been suspicious of my scholarship because of my vocational background that, 'Hmmm, we really are on the same page after all.'"

For more information, contact Carol Conroy at 607-255-7381 or cac29@cornell.edu

colleagues and all the education students see the value of learning in context, and the math/science faculty demonstrated the importance of educational theory.

"What is it about career and technical education that is unique and needs to be preserved?" Conroy asked. "It is the technical specialty. I don't expect a math or science teacher to know everything about agriculture" that an agriculture teacher should know.

Attendees at Conroy's session agreed that modeling curriculum integration in university programs is the best way to encourage collaboration between high school teachers in different disciplines.

Such collaboration also might be part of the solution to a persistent issue raised continually during the symposium: concern that universities do not have an adequate supply of qualified CTE faculty. Over the past decade, many universities have chosen not to fill vacant CTE positions created by retirements and have closed entire programs through attrition.

"We can't train people because we lack the faculty," said Deborah Bingham-Catri of the Center on Education and Training for Employment at Ohio State University.

Moderator Allen Phelps, director of the University of Wisconsin's Center on Education and Work, raised the question of whether the real crisis in teacher education might be a loss of the infrastructure required to prepare new teachers and serve the existing workforce. If that is the case, said some participants, better collaboration between CTE and other professional schools could create economies of scale and build the needed support for career and technical education within the university.

Alternative Routes to Licensure

Not all CTE teachers enter the classroom through traditional, university-based programs. Sometimes they have degrees in other subject areas and/or have been working outside of education when they decide they want to teach a CTE subject. Most states have different licensing requirements for these teachers—usually some combination of education and years of experience. For example, if a mason decides he wants to teach in a construction technology program, he would first have to provide most states with

an employment history and then, typically, agree to complete a set of pedagogy courses before his temporary teaching license expired.

This pathway to teaching is called "alternative," "provisional" or "emergency" licensing, though historically it has been the traditional route for teachers of trade and industrial education. Critics of this route say it contributes to CTE's image problem and could shortchange students because teachers with alternative licenses don't necessarily need a college degree to teach. But symposium participants suggested that more and more CTE teachers are choosing this route, and states are not inclined to restrict it at a time when many schools are desperate for teachers.

"Emergency certification is like temporary Army housing," observed one participant. "It's here to stay."

This is not to say there was an air of resignation at the symposium about alternative licensing. Participants agreed with the need for flexibility in licensing and also understood that university faculty must do more to bring their programs to new and prospective teachers through such vehicles as online courses and PDS models.

One of the chief concerns about giving untrained teachers responsibility for a classroom full of students is that, no matter how skilled and experienced they are in their technical specialty, they often lack an understanding of how to communicate with young people of varying abilities and interests. On top of that, they need to learn what is important to teach, where students have the biggest conceptual problems, and how to assess student understanding. However, many participants said they have found that teachers who come from industry often are more grounded, mature, and committed¹ than younger teachers who come right from universities—and they can be excellent instructors if they get the education they need to understand child development, psychology, curriculum design, assessment, and other key matters.

"We can't satisfy the demand for teachers through [traditional routes]," said Bingham-Catri. "The question is how can we help people coming from other areas be successful teachers?"

In Pennsylvania, 85 percent of teachers of health occupations, trade and industrial courses, and occupational home economics come to their classrooms through an alternative certification route, said Richard Walter of Penn State University. Candidates for provisional licenses must first prove two years of wage-earning experience beyond the internship/apprenticeship level in the subject they are to teach, and they must pass an occupational competency exam. Then the university's Workforce Education and Development program faculty do all they can to ensure these industry professionals acquire the pedagogical knowledge and skills that able teachers need. They do this, in part, by spending significant amounts of time observing and mentoring the teachers in their programs.

The goal is still education, not expediency. "We get [those with less than a four-year degree] to move into a bachelor's degree program, if at all possible," said Walter. "The traditional approach is '60 credits and I'm done.'"

"Typically we have thought of [trade and industrial education] as the alternative model," said Atkinson. "Unless we move quickly [to make higher education more flexible], our traditional model of going through a university program in four years will become nontraditional and the alternate route will become traditional."

Atkinson and others praised universities for embracing online education and encouraged them to continue delivering more pedagogical courses over the Internet. Symposium participants also supported focusing an equal amount of effort on getting professors off the campus and into high schools to guide new teachers and getting universities to collaborate with each other and with secondary schools to set up regional centers for initial preparation and professional development.

"If we don't move, someone else will," Atkinson asserted, suggesting that secondary schools will simply look to other education providers to bring their provisionally licensed teachers up-to-speed if universities won't meet them halfway.



Recommended Federal Actions

- ▶ Provide more funding specifically for teacher education programs. Without a separate pot of money for teacher education, states tend not to emphasize it.
- ▶ Promote the concept of career clusters in all initiatives, not just those within OVAE and engage nonprofit organizations such as the Association for Career and Technical Education to help spread the word. A prevalent view was that the more career clusters become accepted in secondary schools, the more teacher educators will be inclined to use those clusters to guide university-level programs.
- ▶ Support the development of high-quality programs that provide teacher education for people coming into the field from other professions.

Providing Support to New CTE Teachers

Strengthening the support that teachers receive during their initial years of teaching is widely acknowledged as vitally important in all teaching fields, but it poses special challenges in CTE teaching because a large percentage of teachers come straight from industry to the classroom. And, as difficult as it is to recruit new teachers, it can be just as tough to retain them after their first year if they are not provided the support that novice teachers dearly need.

While schools of education place a good deal of emphasis on theoretical and conceptual issues, such as getting their students to rethink their notions of teaching and learning, classroom management is still a top priority for new teachers. "What teachers want to do is get through attendance," commented Kenneth Welty of the University of Wisconsin-Stout.

This speaks to the need for university teacher educators to provide more clinical experience for teacher candidates before they graduate. It also means school and district personnel must do all they can to support new teachers so they do not feel as if they have been thrown into stormy seas without a lifeline.

The issues may be somewhat different for a 22-year-old graduate of a teacher education program versus a 42-year-old industry professional who decides to embark on a teaching career, but both types of new teachers need attention as they enter the profession.

Commented Edith Aydlett-Whitmore, a curriculum specialist for Baltimore City Schools: "When teachers come from business and industry, there's a whole lot more they must know than just technical skill, like understanding the chain of command in a school system, how to relate to young people, why you have to do lesson planning every day."

As alternative routes to licensing grow in many states, teacher educators are being asked to provide crash courses in pedagogy. "We are trying to figure out how to do this . . . in a way that doesn't scare [the new teachers] to death," remarked Deborah Bingham-Catri of Ohio's Center on Education and Training for Employment.

Bingham-Catri said that Ohio has reduced by 75 percent the amount of money it used to put toward sending faculty out into the high schools to help new teachers, yet superintendents are desperate for this kind of support. There appeared to be consensus among the symposium participants that university education faculty need to spend more time in the classrooms with new teachers.

Ann Foster of Colorado State University (CSU) described in detail the mentoring studies that CSU's Research and Development Center has conducted with an eye toward improving the experience of first-year teachers.

Foster also sits on the board of the Colorado Partnership for Educational Renewal (CoPER), a collaborative of deans, superintendents, and other educational leaders from eight systems and 16 school districts. CoPER brings together in formal partnership all the local players in teacher education, including the arts/sciences and K-12 personnel managers. Foster explained that the arrangement "cuts down on competition and smoothes the way for grants."

► ► ► *School and district personnel must do all they can to support new teachers so they do not feel as if they have been thrown into stormy seas without a lifeline.*

CoPER found that some schools have structured mentoring programs for new teachers, and other schools have nothing. "We found a need for strong linkages between institutions of higher education and school districts," Foster said. "It was abundantly clear there was no connection between new teachers and their university, and first-year teachers were bothered by that."

CoPER recently surveyed new teachers and principals about the quality of their preservice programs. Both said their strength was strong content training. But what new teachers really need that they don't get in preservice education is help in areas such as these:

- ▶ planning whole class lessons;
- ▶ understanding the culture of their school;
- ▶ learning how to communicate with children in age-appropriate ways;
- ▶ coping with discipline issues;
- ▶ preparing for assessment; and
- ▶ using data to improve teaching and learning.

Another concern is that new teachers didn't see themselves as part of a group. "On matters of discipline, a teacher will say, 'I can't handle this kid. What do I do? I'll close the door and hope nobody notices.' Teachers need somewhere to go for help," Foster asserted.

Foster's audience noted that the concerns she mentioned are ever present. She agreed but stressed that good teacher preparation and mentoring can help alleviate these concerns more quickly.

Foster explained that mentor training has to start with master teachers who know their craft well. Even then, master teachers often don't have the skills to work with adults. It's about working with a colleague, not an underling. Mentors in many cases are not trained to do observation, so they're not sure what skills to look for or exactly how to give feedback constructively.

Ideally, mentors at the high school level should teach the same subject as the new teachers because these teachers often have questions and concerns that directly relate to subject matter and content specific pedagogical issues. Mentors should be accomplished

teachers who want to play this role. No single mentor should be assigned more than one or two new teachers a year. Ideally, the school's administrators should reshape the mentor's day so there is adequate time to discharge these important responsibilities.

In Colorado, some of the larger, more affluent districts have mentor trainers within their human resources departments, and in other cases mentor education occurs by happenstance. Foster suggested that universities would do well to be the provider of mentor training and that they tie it in with their agreements for preservice practicums.



Recommended Federal Actions

- ▶ Support paid summer institutes for new teachers that focus on such topics as working with diverse learners and teaching to standards.
- ▶ Encourage schools to require at least monthly inservice sessions for new teachers that focus on pedagogical challenges and revolve around student work.
- ▶ Encourage schools to provide an extensive new teacher orientation before school starts and assign mentors to new teachers.
- ▶ Identify best practices for teacher mentoring—not a research document, but something practitioners can really put to use.
- ▶ Provide grants that enable colleges to send their faculty into the schools to coach new teachers.

Building the Knowledge Base of Existing CTE Teachers

Much of the discussion about improving teacher education tends to focus on initial preparation and licensure, but becoming licensed should mark only the beginning of a teacher's education. New teachers still have a great deal to learn. Licensed teachers also need continuing education throughout their careers to help them keep up-to-date on academic and industry standards, new assessment methods, technology, and advances in teaching and learning. Unfortunately, the professional development most teachers get tends to be cursory and infrequent.

"The preparation of teachers is a continuum," noted Jerry Tuchscherer during a panel discussion. "Their education doesn't stop when they walk out of an institution. Universities should share that responsibility with school districts."

Overall, participants seemed to agree that teachers benefit more from ongoing professional development conducted throughout the year and that the most beneficial training is geared toward helping teachers create their own activities rather than prescribing a lesson plan or learning approach.

According to SREB's Gene Bottoms, who led a session on transforming pedagogy, teachers require at least 20 hours of focused instruction to achieve some benefit. However, data from a 1998 survey of vocational-technical teachers in *HSTW* schools indicated that the demand for staff development on particular topics far outpaced its supply.

PERCENTAGE OF TEACHERS RECEIVING STAFF DEVELOPMENT ON PARTICULAR TOPICS VERSUS PERCENTAGE REPORTING SUCH STAFF DEVELOPMENT NEEDS

Topics	Received 20+ hours	Needed
Using math concepts in field	5%	36%
Using scientific inquiry to solve problems	5%	47%
Using reading, writing, and presentation skills	11%	41%

Bottoms also asserted that schools continue to struggle to make time for such activities and that their lot is further complicated by a shortage in the supply of strong CTE staff development providers.

The Southern Regional Education Board, through its *HSTW* network, supports staff development for CTE and academic teachers through

- ▷ a national networking conference designed to get academic and vocational teachers to collaborate;
- ▷ national workshops, such as "reading for learning";

- ▶ site-specific workshops for its members; and
- ▶ statewide staff development.

Roger L. Putnam Vocational Technical High School in Springfield, Massachusetts, used the *HSTW* principles to turn around this once failing school, explained Principal Ann Southworth. Part of the Putnam plan is extensive professional development for teachers, including

- ▶ seven professional development days built into teacher contracts;
- ▶ paid summer, afternoon, and Saturday workshops; and
- ▶ regular in-school workshops.

These professional development activities cover topics such as reading across the curriculum and improving students' self-discipline. Academic teachers at Putnam also have received training in active teaching strategies that emphasize inquiry, problem solving, projects, and applied learning. This is especially important in the ninth grade, where many students need to be taught in ways that differ from those that have failed them in the past.

Bottoms stressed that effective professional development is team oriented. The *HSTW* conferences require school personnel—including teachers of academic and vocational subjects, administrators, and teacher educators—to register as teams.

High school teachers aren't the only ones who require continuing education, but post-secondary faculty usually are not exposed to much professional development. Some postsecondary institutions, such as the Community College of Denver, are doing something about this. Dianne Cyr described the college's on-campus Teaching and Learning Center, which she directs. The center was started in the early 1990s primarily because the college found its instructors needed help connecting with a diverse student population. Now it is the primary source of continuing faculty education on a variety of issues.

The center awards mini-grants of about \$1,000 each to faculty to research an issue tied to the college's objectives, and faculty then present their findings to their col-



PROMISING PRACTICES: A Symposium Profile

Helping Community College Faculty Teach Effectively

Educators juggle many demands, so it's easy to see why teacher professional development can get pushed to the bottom of the priority list. Busy instructors often feel that the occasional seminars and workshops they are required to attend are a needless distraction, and administrators wonder which types of training are really worth the investment.

But at the Community College of Denver, professional development is ongoing, systemic, and not especially expensive. Its on-campus Teaching and Learning Center (TLC), established in 1991, provides dozens of workshops each year on a focused set of issues that the college has deemed important. Faculty receive small grants to research those issues and deliver the workshops—an approach that ensures relevance and affordability. All faculty must earn a fixed number of continuing education credits each year, and their participation is considered during performance evaluations.

The community college budgeted \$332,000 in fiscal year 1999–2000 for the operation of TLC; \$24,000 of that paid for the mini-research grants in the form of release time or overload pay, and another \$100 went to each faculty member who presented a workshop on findings. "This is a way we can recognize their skill, and it's also cost-effective," explained TLC director Dianne Cyr.

Faculty send out proposals in the fall and spring, and the college favors those that address its "action priorities," which all personnel help set. Last year's priorities included serving diverse populations and assessing and enhancing programs. Some of the faculty projects that result from the mini-grants are quite sophisticated, such as a CD-based study guide and tutorial one instructor developed for obstetric nursing.

TLC staff also are involved in teacher recruitment and advocacy efforts. Their work helped the college win TIAA-CREF's prestigious Theodore M. Hesburgh Award in 2000 for excellence in college and university teaching.

For more information, contact Dianne Cyr at dianne.cyr@ccd.cccoes.edu or TLC at <http://ccd.rightchoice.org/tlc>

leagues. This approach enables the college to fund—inexpensively—dozens of workshops all year long. This is one example of the kind of peer-driven professional development that is gaining credence in the research literature.

Cyr said that one key to the success of any professional development program is a clear signal from a school's leadership that continuing education is crucial. The Community College of Denver requires all faculty to accumulate professional development credits—30-clock hours in a year for probationary faculty, and 90 hours over five years for those with a five-year credential.

"The faculty at first were not excited about the center. Their feeling was, 'What are you going to teach me?'" Cyr said. "Now we have almost full participation."

Sometimes states and school districts would like to provide more professional development for their CTE teachers, but it is a challenge to deliver the instruction. Maryland, for example, has only one remaining CTE teacher education program—at the University of Maryland Eastern Shore, a campus that is not conveniently located for many teachers in the state. Consequently, the university started a center for teacher professional development in cooperation with a group of school systems around Baltimore to provide instruction for teachers throughout Maryland. The participating school districts agreed to fund the salary of center personnel and also serve as advisors. The Maryland State Department of Education provides grants to the center to support state-approved workshops and courses needed for initial certification.

► ► ► *Teacher
education doesn't stop
when they walk out
of an institution.
Universities should
share that responsibility
with school districts.*



Recommended Federal Actions

- ▶ Identify and disseminate information on highly promising teacher development programs that build the competence of CTE teachers to offer high-quality career and technical education and make their most promising practices well known to the larger community.
- ▶ Support the development of CTE teacher networks dedicated to strengthening curriculum and instruction.
- ▶ Encourage teacher development activities that bring the world of work into the classroom for academic as well as CTE teachers and that foster collaboration between CTE and academic teachers.
- ▶ Encourage states and localities to support brief sabbaticals for teachers so they can leave the classroom to observe industry practices.

Improving Recruitment of Future CTE Teachers



Participants agreed that finding new prospects to replace retiring CTE teachers and to fill new slots that come open for other reasons is a particularly challenging issue. Schools in many areas around the country are anticipating shortages of CTE teachers as the number of high school-age students increases and the teacher workforce ages.

At the same time, as presenters and participants noted in earlier sessions, the changing U.S. economy, along with new academic and industry standards, have combined to create a new profile for the desired CTE teacher—one who is familiar with both the technical and academic demands of a profession. Ideally, these teachers also are committed to helping children succeed and are passionate about their subject area.

Yet participants continually raised this question during the meeting: how can districts attract these individuals during an economic boom when teacher salaries still rank among the lowest of the professions and the public still harbors a negative impression of teaching as a career?

"How are we going to keep good teachers and fight an external labor market that cherry-picks people by offering double the salary and 10 times [better] working conditions?" asked Jane Oates, a senior education advisor to the U.S. Senate's Health, Education, Labor and Pensions Committee.

"Teaching does not support attracting those with life experience that can liven up the subject for students," observed a participant. "Salary is a huge issue."

Others cited examples of states that are offering incentives to attract teachers, such as "signing bonuses," paid tuition, or debt forgiveness in return for an agreement to teach in

the state for a specified period. San Francisco recently announced plans to create subsidized housing for teachers.

The problem extends to attracting quality teacher educators, noted Howard Lee. "This year we spent about \$100,000 to bring in industry people to be teacher educators. Finding quality faculty has been difficult when people in the telecommunications industry are making between \$80,000 and \$100,000. We can't come close to that."

Participants and presenters agreed that teacher salaries should be raised, but that has been a perennial recommendation. Outside of across-the-board raises, they suggested other ways states and districts could be more competitive in the job market:

- ▶ Adopt the practice of giving signing bonuses with the understanding that this approach only serves to help get people in the door. No matter how large the bonus may be, teachers won't stay on the job if they are not supported in other ways. Recruitment must be linked to retention strategies.
- ▶ Promote teaching as a career to secondary school students and ensure high school guidance counselors make students aware of this option. (For example, see the Promising Practice on the next page.)
- ▶ Coordinate licensing requirements to smooth the way for teachers who want to move to other states.
- ▶ Consider other financial benefits for teachers, such as forgiveness of loans and exemptions from state taxes.
- ▶ Create scholarships specifically for CTE teachers.



Recommended Federal Actions

- ▶ Examine the various ways in which states and localities are reaching out to recruit people from industry into teaching and disseminate the findings.
- ▶ Help defray the cost of tuition for a degree in education.
- ▶ Create an online clearinghouse of information that keeps track of what states are doing to recruit teachers.
- ▶ Join with others to create a public relations campaign that promotes teaching as a rewarding career.



PROMISING PRACTICES: A Symposium Profile

Grow Your Own: Recruiting Qualified Teachers

South Carolina's top education goal is one with which every state can identify: "Every student in the public schools has a competent, caring teacher."

Unfortunately, it's not as simple as it may sound. The state has exhausted its supply of teachers in almost every county and subject area. Hundreds of vacancies remain, and the state's average turnover rate has nearly doubled since the early 1990s. Meanwhile, at current graduation rates, South Carolina's teacher education programs will produce only about 75 percent of the teachers the state will need in the next decade.

To combat those difficulties, the state has supported the South Carolina Center for Teacher Recruitment. The 14-year-old center's current budget of about \$2.7 million funds innovative programs designed to interest middle school and high school students, college students, and adults in teaching careers. A task force that oversees the center's budget and operations includes representatives from colleges and universities, education agencies, professional education associations, the state General Assembly, and private businesses.

One of the center's best-known programs is a yearlong high school course called Teacher Cadet, which exposes juniors and seniors to teaching and brings them into public school classrooms outside their own school to observe and participate in teaching activities.

"Research indicates that students decide by age 14 what they don't want to be when they grow up," said Ann Byrd, the center's director. And 52 percent decide on a career choice before they leave high school, so the center's philosophy is to recruit future teachers as early as possible.

Teacher cadets must have at least a 3.0 average in a college-prep curriculum, obtain five written recommendations from teachers, and write an essay about why they want to join the program. The center provides teacher training, a curriculum, and grants to help Cadet sites pay for supplies, field trips, speakers, and the like. Thirty-six percent of the 1988-99 group said they planned to pursue a teaching career.

The center's staff of 17, which includes seven teachers in residence, oversees other programs and services like these:

- Online Application, a statewide education placement service for teachers.
- ProTeam, a middle school course designed to interest seventh and eighth graders in teaching as a career.
- Teaching Fellows, which offers \$24,000 in college scholarships for outstanding education majors.
- An annual recruitment job fair.
- Training for teachers interested in implementing Teacher Cadet or ProTeam programs.
- A newsletter, Web site, and other publications that keep educators up-to-date on recruitment activities and issues.

The January 2000 *Education Week's* "Quality Counts 2000" survey ranked South Carolina's efforts to raise teacher quality as second best in the nation.

For more information, call 800-476-2387 or visit www.scctr.org

Quality Assurance in CTE Teaching- Licensing and Advanced Certification



As some local districts struggle to find qualified individuals for open teaching positions, how do they ensure they do not sacrifice quality? How do states ensure there is a system in place to help teachers steadily improve their practice and move beyond a minimum standard? And how can they make the profession more accessible to those with industry experience and ensure that all teachers have a solid grounding in the knowledge base of teaching?

Symposium participants acknowledged that most states face these difficult challenges and that their different licensing requirements only complicate matters. University of Georgia Professor Richard Lynch cited a National Center for Research in Vocational Education report that shows many states lowered the bar for CTE teacher qualifications from the late 1980s to the mid-1990s. Teachers who lacked the qualifications required for state licensing were often granted some sort of alternative license during this period. One study, he said, found that less than 40 percent of CTE teachers in the South came from teacher education programs. Most entered the classroom directly from the industry in which they had been employed.

New national standards for advanced teacher certification can be the basis for rethinking CTE teacher education, Lynch said. They provide a rationale for colleges and universities to offer new courses that address the standards and revise existing courses. When joined with compatible performance-based program accreditation standards, they can also offer a framework for reformulating licensing systems that will both broaden access and better protect children from inadequate practice.

National Board for Professional Teaching Standards

One of the most successful examples of teaching standards that can help elevate the profession come from the National Board for Professional Teaching Standards (NBPTS), a nonpartisan group that offers advanced certification for accomplished teachers who pass a rigorous evaluation.

Chuck Cascio, an NBPTS vice president who was one of its first teachers-in-residence, led a discussion about the group's efforts over the past several years. Since 1987, the 63-member board, composed primarily of classroom teachers, and its committees have developed standards for 24 teaching fields, including career and technical education. Its mission is to establish high and rigorous standards of what teachers should know and be able to do; develop and operate a national, voluntary system to assess and certify teachers; and advance related education reforms to improve student learning in American schools.

Cascio explained that NBPTS's system rests on five core propositions that frame its standards in each teaching field:

1. Teachers are committed to students and their learning.
2. Teachers know the subjects they teach and how to teach those subjects to students.
3. Teachers are responsible for managing and monitoring student learning.
4. Teachers think systematically about their practice and learn from experience.
5. Teachers are members of learning communities.

Newly edited CTE standards are now available and include subspecialties in eight fields: agriculture and environmental sciences; arts and communications; business, marketing, information management, and entrepreneurship; family and consumer sciences; human services (education, child care, law and legal studies, and so on); health services; manufacturing and engineering technology; and technology education.

Some participants in Cascio's session weren't sure that NBPTS's current approach to CTE certification was the right one because it offers just one certification for a diverse field. Cascio pointed out that while a single certificate is awarded, the assessment

process recognizes the distinct differences between the eight subspecialties in several ways. The process has two parts: a portfolio that teachers compile during the school year and assessment center exercises that are administered by computer in the summer. The portfolios that teachers submit to demonstrate their practice include tasks that are specific to their subspecialties and are judged by accomplished teachers from the same subspecialty. Some of the assessment exercises recognize the different knowledge bases and curricular issues specific to CTE subspecialties, while others are more general.

This past school year, 1999–2000, was the first year of eligibility for certification in the CTE field. About 580 CTE teachers began the process, and 413 completed it. Of these, 248 became the first recipients of National Board Certification in career and technical education this past November.

Each teacher went through a rigorous assessment that included two videotaped portfolio entries of their classroom performance, a review of their students' work, and several assessment center exercises.

All NBPTS committees have representatives from higher education, and a growing number of teacher education programs have incorporated the Board's standards into their curricula. In some master's degree programs, completing the National Board certification process is the culminating activity. A brochure that lists those universities and contact people will soon be available on the Board's Web site (www.nbpts.org).

Several colleges and universities have begun programs to help candidates get ready for National Board Certification. They also assist candidates who do not achieve certification on their first attempt. In both instances, the process encourages teachers to take a self-critical look at their practice and to articulate their rationale for key instructional decisions they confront each day.

Cascio said most applicants for National Board Certification are mid-career teachers who come from states that offer incentives such as higher salaries or one-time bonuses for those who meet the Board's exacting standards.

▶ ▶ ▶ *New national standards for advanced teacher certification can be the basis for rethinking CTE teacher education.*

National Council for Accreditation of Teacher Education

The National Council for Accreditation of Teacher Education (NCATE) is another group that is contributing to the teacher quality standards movement. Jane Leibbrand of NCATE spoke about the group's efforts to "be a catalyst for improvement within the field, set expectations for change, and create new norms in teacher education."

NCATE evaluates teacher education programs according to its standards. One recent development has been the group's move to performance-based accreditation. In the past, programs had been assessed on college and university inputs—syllabi, course offerings—using standards that were developed in collaboration with the pertinent disciplining association(s) in each field. Now the accreditation process also will consider how well teacher candidates know their subject matter, have command of pedagogy, and whether graduates wind up teaching in the subject areas for which they prepared.

To determine how well a program's teacher education students meet these criteria, the new NCATE process examines student results on Praxis II or other content knowledge test. (There is no Praxis II exam for CTE candidates, so other tests, such as those from the National Occupational Competency Testing Institute, would be used.) NCATE also expects its member colleges and universities to have an evaluation system in place to assess its students. NCATE also requires that accredited teacher education programs

- ▶ fully involve K-12 schools in the education of candidates;
- ▶ ensure their candidates know how to help all students learn—not just some;
- ▶ model effective teaching; and
- ▶ prepare their students to use technology effectively.

NCATE uses internal sources of evidence, such as lesson plans, essays/journals reflecting on teaching, observations and videotapes, and tests used to evaluate candidates, as well as external sources such as state licensing pass rates. Reviewers also talk to a sample of candidates and their students, fellow teachers, and principals.

Twenty-eight states have adopted or adapted NCATE unit standards (those that apply to the entire institution) for their public universities, and 17 have done so for NCATE's program standards (those for specific content areas such as mathematics).

Institutions in 46 states are reviewed according to NCATE's program standards or standards that correlate closely with them.

"We encourage institutions not to treat this process as something special but as part of an everyday or ongoing activity," Leibbrand said.

Leibbrand cited a recent Educational Testing Service study that found graduates from NCATE institutions were more likely to pass certification and licensing exams. She said it was unacceptable for schools to hire unqualified teachers just to fill an open space: "We create the impression that there are qualified teachers in every classroom."

Suggested Richard Lynch of the University of Georgia, "We need to outline what the expectations are for teacher education programs so there is some consistency across each state."

Several participants advanced the position that state licensing authorities should have the same expectations of CTE teachers as they have of academic teachers. Having one set of licensure requirements for one group and a lower set for another perpetuates the attitude that the second group is outside the mainstream. In the same vein, these attendees believed that the field should identify a set of core competencies that all CTE teachers should meet, regardless of whether they are agriculture, business, consumer and life sciences, health occupations, marketing, technical education, or trade and industrial teachers.



Recommended Federal Actions

- ▶ Sponsor research on the effectiveness of various alternative licensing programs on CTE teacher recruitment, induction, performance, and retention.
- ▶ Identify and disseminate information on state, local, and institutional initiatives that are strengthening teaching practice and effectively preparing CTE teachers for National Board Certification.
- ▶ Examine multiple models of program accreditation with respect to their influence on program quality and their capacity to identify underperforming programs.

Conclusion



This symposium, while organized around a set of basic concerns about the current state of education for career and technical education teachers, covered a much broader band of issues. This is not surprising because career and technical education does not exist in isolation from the larger objectives of the American high school, nor should it. And CTE teacher education, when well executed at colleges and universities, is typically not confined to faculty who specialize in career and technical education.

As the preceding pages have demonstrated, there is no simple set of discrete factors that influences the quality of CTE teacher education. The issues are complex and often play off one another. What follows is a brief summary of the larger themes that participants seemed to return to on multiple occasions during the course of the symposium. These might be described as the major points of consensus that exist today among the CTE leadership community.

What we want all students to know and be able to do when they graduate from high school and the kinds of learning experiences that will get them there

- ▶ Command of the core academic knowledge and skills that promote flexibility and the ability to reason and offer solutions to unfamiliar problems.
- ▶ Deep understanding of this academic knowledge and skill, not just surface awareness that is likely to fade after a test. This means the curriculum should focus on the central ideas in each field and provide students with opportunities to apply the knowledge and theory they are learning to engaging, real-world dilemmas.
- ▶ Industry knowledge and related skills that prepare them not just for short-term, entry-level job opportunities but also for long-term careers.

What CTE teachers need to know and be able to do to make this happen

- ▶ Solid command of industry knowledge and skills and knowledge of how they are best learned by students.
- ▶ A basic understanding of the academic disciplines and how to integrate academic concepts into CTE courses.
- ▶ Ability to develop in their students work-readiness skills and high-performance workplace skills (e.g., teamwork, problem solving, communicating).
- ▶ Ability to create a classroom environment that is highly supportive of learning, creativity, and risk taking, that respects diverse points of view and that otherwise embraces democratic values.

What academic teachers need to know and be able to do to work constructively with CTE teachers

- ▶ Solid command of their discipline.
- ▶ Ability to place before students commonplace problems that require them to draw on their understanding of theory and key concepts.
- ▶ Ability to engage students in more active learning that will deepen their knowledge of the field.
- ▶ Knowledge of how their subject is used in the workplace, home, and community.
- ▶ Knowledge about one particular industry.⁶

While some argue that students and schools would benefit if the current distinctions between academic and CTE teachers would evaporate, this is unlikely to happen in the foreseeable future. However, participants were clearer about how both camps could improve their teaching, and their suggestions bring up two salient points:

- ▶ The good news is that most leading practitioners and scholars in both the core academic disciplines and in career and technical education are closer than they may realize in their thinking about the kinds of teaching and learning that need to be fostered in high schools.
- ▶ The bad news is that not enough academic or CTE teachers have been educated to do the kind of teaching that connects theory and practice, that supports active learning, or that is well aligned with what the cognitive science research literature has concluded about how students learn.⁷

⁶An attribute that is probably most accurately characterized as desirable but not essential by most attendees.

⁷These findings are well summarized in J.D. Bransford, A.L. Brown, and R.R. Locking (Eds.), (1999). *How People Learn: Brain, Mind, Experience, and School*. Washington, DC: National Academy Press; and in N. Lambert and B. McCombs (Eds.), (1998). *How Students Learn: Reforming Schools Through Learner-Centered Education*. Washington, DC: American Psychological Association.

What changes in teacher education are needed to provoke the kind and quality of teaching America's students need

- ▶ CTE teachers need to be able to join industry and academic knowledge and skill for their students. To do so, college and university faculty in all pertinent disciplines need to collaborate in the design of new, integrated teacher education programs. This means CTE faculty should be working not only with arts and sciences faculty but also with other faculty from the education school and from professional schools.
- ▶ College faculty need to model the "active learning" forms of pedagogy advocated by the cognitive science research literature.
- ▶ College faculty need to spend more time in high schools with both novice and highly accomplished teachers and in the industries in which they specialize. At the same time, universities need to recognize and reward the contributions of college faculty to improving high school education.
- ▶ High and rigorous standards for CTE teacher education need to be developed and reliably and fairly employed by accreditation agencies.
- ▶ Licensing requirements for CTE teachers should be as demanding as requirements for other teachers, even as they take account of different kinds of expertise and routes to teaching.
- ▶ School leaders need to build a culture of continuous professional development that includes peer review, self-examination, and inquiry to support the induction of novice teachers and foster the professional growth of experienced teachers. And this should be matched by a commensurate investment of time and dollars.

Making progress on all of these fronts will not happen overnight. It will take the sustained attention of multiple parties—universities, state departments of education, local districts, the federal government, and the foundation community. School leaders, college and university leaders, government officials, and foundation officers all have a role to play. There is no question that bold, dramatic, and swift action is needed. Symposium participants agreed that while exemplary CTE programs can be found scattered throughout the nation's high schools, community colleges, and four-year institutions, such programs are the exception, not the rule.

Appendices



Appendix A: The Agenda for the Conference

Appendix B: The Final Participants List

APPENDIX A

EDUCATING CAREER AND TECHNICAL EDUCATION TEACHERS

BUILDING A NEW MODEL

*Sponsored by the U.S. Department of Education, Washington, DC
Omni Shoreham Hotel*

▶▶▶ TUESDAY, JUNE 13

- 7:00 Registration**
Truman Room
- 7:30- 8:30 Continental Breakfast**
Truman Room
- 8:30- 10:15 Educating Career and Technical Education Teachers: The Challenges Ahead**
Patricia W. McNeil, Assistant Secretary for Vocational and Adult Education
U.S. Department of Education
- Preparing Teachers for the Challenge of Education in the Next Century:
Science as a Core Subject**
Bruce Alberts, President
National Academy of Sciences
Blue Room
- 10:15- 10:35 Mid-morning Break**
- 10:35- 12:00 Putting the Best Ideas on the Table (facilitated discussions)**
- ▶ **A 21st-Century Vision of Career and Technical Education**
Katharine M. Oliver, Maryland State Department of Education
Governor's Boardroom
 - ▶ **The Content and Structure of CTE Teacher Education**
Richard L. Lynch, University of Georgia
Capitol Room
 - ▶ **Improving Recruitment of Future CTE Teachers**
Rodney Kelly, Kentucky Department of Education
Senate Room
 - ▶ **Providing Support to New CTE Teachers**
Allen Phelps, University of Wisconsin
Forum Room
 - ▶ **Quality Assurance in CTE Teaching - Licensing, Alternate Paths, and
Advanced Certification**
Tom Blanford, North Carolina Professional Teaching Standards Commission
Cabinet Room

12:00- 1:00

Lunch*Truman Room*

1:15- 2:30

Building a New Model: A Conversation

June S. Atkinson – North Carolina Department of Public Instruction

Nick Coviello – School District of Philadelphia

Kenneth C. Gray – Pennsylvania State University

Roy Kimmins, Jr. – Southwest Guilford High School, NC

Jane Oates – U.S. Senate, Committee on Health, Education, Labor, and Pensions

Krisann Pearce – U.S. House of Representatives, Committee on Education and the Workforce

Barbara Roche – Regional Education and Business Alliance, MA

Larry Rosenstock – High Tech High School, CA

Moderator - Gary Hoachlander, MPR Associates, Inc.*Blue Room*

2:30- 2:45

Mid-afternoon Break

2:45- 3:45

New and Promising Policies and Practices - Round I▶ **Creating Innovative Teacher Recruiting Initiatives Including Pre-Collegiate Programs**

Ann Byrd, South Carolina Center for Teacher Recruitment

Director's Room▶ **Guiding First-Year Agriculture Education Teachers**

Lee Cole and Greg Thompson, Oregon State University

Forum Room▶ **Growing the Capacity of the Community College Faculty to Teach Effectively**

Diane Cyr, Community College of Denver

Governor's Boardroom▶ **Coordinating Initial Preparation and Inservice Education Through an Urban Center**

Robert C. Gray, Maryland Center for Career and Technology Education Studies

Capitol Room▶ **Increasing Access to Teacher Education Through Web-based Multimedia Courses**

Betty Heath-Camp, William G. Camp, and Daisy L. Stewart, Virginia Tech

Cabinet Room▶ **Trusting Industry Experience: New Jersey's Alternate Approach to Addressing Teacher Shortages**

Thomas Henry, New Jersey Department of Education

Senate Room▶ **Harnessing Technology for Effective Professional Development in Mathematics and Science**

Dan Hull and Piers Bateman, CORD

Embassy Room

4:00- 5:00

New and Promising Policies and Practices - Round II

- ▶ **Developing Contextual Teaching and Learning Programs for Practicing Teachers**
Robert G. Berns and Patricia M. Erickson, Bowling Green State University
Thomas Sargent, University of Wisconsin
Senate Room
- ▶ **Operating a Professional Development School for Preservice Academic and Inservice Second-Career Teachers**
Robert Kemmery and Vashti C. Goldstein, Eastern Technical High School, MD
Elizabeth Wilkins-Canter, Towson State University
Governor's Boardroom
- ▶ **Establishing a Family and Consumer Sciences Distance Education Alliance**
Gay Nell McGinnes, Texas Education Agency
Forum Room
- ▶ **Taking a State Distance Learning Program for Business and Marketing Teachers National**
Terry O'Brien and Cheryl Caddell, North Carolina State University
Embassy Room
- ▶ **Project Promise: An Accelerated Program for Bringing Mid-Career Engineers into Teaching**
Angie Paccione, Colorado State University
Cabinet Room
- ▶ **Redesign of a Technology Teacher Education Program**
Kenneth Welty and Brian McAlister, University of Wisconsin-Stout
Director's Room
- ▶ **Collaborating with Community Colleges to Expand the Pipeline of CTE Teachers**
Carl A. Woloszyk, Western Michigan University
Capitol Room

▶▶▶ WEDNESDAY, JUNE 14

7:30- 8:30

Continental Breakfast*Truman Room*

8:30- 10:00

Designing 21st-Century Teacher Education Programs: A Conversation

Mary Jane Clancy – School District of Philadelphia
 Todd Fields – Westbrook Regional Vocational Center, ME
 Steven H. Godowsky – Hodgson Technical High School, DE
 Howard D. Lee – University of Wisconsin-Stout
 Victoria L. Lukich – David Douglas High School, OR
 Jerry Tuchscherer – University of Idaho

Moderator – Gary R. Galluzzo, National Board for Professional Teaching Standards
Blue Room

10:00- 10:20

Mid-morning Break

10:20- 12:00 Transforming CTE Teacher Education

- ▶ **Building Curricula with the Arts and Science Faculty**
Nancy Knapp, University of Georgia
Moderator – Ricardo Hernandez, U.S. Department of Education
Forum Room
- ▶ **Collaborating with Professional Schools and Setting Teacher Education Standards**
Carol A. Conroy, Cornell University
Moderator – George Spicely, U.S. Department of Education
Director's Room
- ▶ **Structuring and Supervising Clinical Practice**
Richard A. Walter, Pennsylvania State University
Greg Thompson, Oregon State University
Moderator – Nancy Brooks, U.S. Department of Education
Senate Room
- ▶ **Mentoring Novice Teachers**
Ann M. Foster, Colorado Partnership for Educational Renewal
Moderator – Susan Toy, U.S. Department of Education
Cabinet Room
- ▶ **Transforming the Pedagogy and Building the Knowledge Base of Experienced CTE Teachers**
Gene Bottoms, Southern Regional Education Board
Ann Southworth, Roger L. Putnam Vocational-Technical High School, MA
Moderator – David R. Mandel, MPR Associates, Inc.
Congressional Room A

12:00- 1:00 Lunch*Truman Room***1:15- 2:45 Framing a New Model of the CTE Teacher (facilitated discussions)**

- ▶ **What Should CTE Teachers Know and Be Able to Do?**
Chuck Cascio, National Board for Professional Teaching Standards
Congressional Room A
- ▶ **Command of the Core Academic Disciplines**
Adrea Steinberg, Jobs For the Future
Senate Room
- ▶ **Career Clusters: Implications for Teacher Education**
Scott Hess, U.S. Department of Education
Forum Room
- ▶ **Improving the Preparation of CTE Teachers: The Power of Accreditation**
Arthur E. Wise, National Council for Accreditation of Teacher Education
Cabinet Room

3:00- 3:45 Meeting Synthesis and Next Steps

Peggi Zelinko, U.S. Department of Education
David R. Mandel, MPR Associates, Inc.
Blue Room

APPENDIX B

Educating Career and Technical Education Teachers

BUILDING A NEW MODEL

June 13-14, 2000
Washington, DC

Sponsored by U.S. Department of Education

FINAL PARTICIPANTS LIST

Patrick Ainsworth
Director and Associate Superintendent
California Department of Education
Sacramento, California

Bruce Alberts
President
National Academy of Sciences
Washington, DC

Leanna Allen
Education Program Specialist
U.S. Department of Education
Washington, DC

Marcia A. Anderson
Professor
Department of Workforce Education and
Development
Southern Illinois University
Carbondale, Illinois

Sharon E. Anderson
Senior Associate
MPR Center for Curriculum and
Professional Development
Washington, DC

Cynthia Arendt
Director, Family and Consumer Sciences
Missouri Department of Elementary and
Secondary Education
Jefferson City, Missouri

Ayele Atayi
Graduate Assistant
Penn State University
University Park, Pennsylvania

June S. Atkinson
Director, Division of Instructional Services
North Carolina Department of Public
Instruction
Raleigh, North Carolina

Robert K. Atterbury
Program Manager
School-to-Career
San Diego City Schools
San Diego, California

Edith M. Aydlott-Whitmore
Curriculum Specialist
Baltimore City Public School System
Baltimore, Maryland

Mark Barrall
Education Program Specialist
Oregon Department of Education
Salem, Oregon

Piers Bateman
Senior Vice President
Partnerships and Networks
CORD
Waco, Texas

Claude Beale
LVEC Supervisor
Milwaukee Public Schools
Milwaukee, Wisconsin

Cheryl Bell
HSTW State Coordinator
Oklahoma Department of Vo-Tech
Stillwater, Oklahoma

Gloria Benjamin
Principal
Timmons ville High School
Timmons ville, South Carolina

Phil Berkenbile
Assistant State Director
Oklahoma Department of Vo-Tech
Stillwater, Oklahoma

Robert G. Berns
Professor
Division of Teaching and Learning
Bowling Green State University
Bowling Green, Ohio

Dennis Berry
Director, Division of National Programs
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Deborah Bingham Catri
Senior Associate Director
Center on Education and Training for
Employment
The Ohio State University
Columbus, Ohio

Thomas T. Blanford
Executive Director
North Carolina Professional Teaching
Standards Commission
Raleigh, North Carolina

Jefferey Blount
Teacher
High Tech High
San Diego, California

John Bobell
Professor
Idaho State University
Pocatello, Idaho

Charlene Bonham
Manager
Baltimore County Public Schools
Towson, Maryland

Gene Bottoms
Senior Vice President
Southern Regional Education Board
Atlanta, Georgia

Gary Borlaug
Licensure Consultant
Iowa Department of Education
Des Moines, Iowa

Wally Bouchillon
Associate Professor
University of West Florida
Pensacola, Florida

Joe L. Boyer
Provost/Vice President of Academic Affairs
Alabama A&M University
Normal, Alabama

Denise Bradby
Senior Research Associate
MPR Associates, Inc.
Berkeley, California

William Briggman
School-to-Career Facilitator
Charleston County School District
Mt. Pleasant, South Carolina

Nancy Brooks
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

John W. Brown
Coordinator, Professional Personnel Development
Pennsylvania State Department of Education
Harrisburg, Pennsylvania

Susan Burge
Consultant
Illinois State Board of Education
Springfield, Illinois

Nanaline Burgess Holt
Education Administration
Alabama State Department of Education
Montgomery, Alabama

Ann Byrd
Program Director
South Carolina Center for Teacher
Recruitment
Ward House, Winthrop University
Rock Hill, South Carolina

Cheryl Caddell
Lecturer
North Carolina State University
Raleigh, North Carolina

William G. Camp
Professor of Agricultural Education
Virginia Tech
Blacksburg, Virginia

Chuck Cascio
Vice President
National Board for Professional Teaching
Standards
Arlington, Virginia

Larry Case
Coordinator of Agriculture and Rural
Education
U.S. Department of Education
Washington, DC

Ron Castaldi
Director, Division of Vocational-
Tech Education
U.S. Department of Education
Washington, DC

Kathleen R. Chernus
Senior Associate
MPR Associates, Inc.
Washington, DC

Dianne L. Cherry
School-to-Careers Facilitator
Theodore Roosevelt Senior High
School
Washington, DC

Becky Clemmons
Director, Career and Technology Education
Humble Independent School District
Humble, Texas

Kenneth Clouse
Director
Northeast Kansas Area Technical School
Atchison, Kansas

David M. Coffey
Professor
Western Kentucky University
Bowling Green, Kentucky

Lee Cole
Department Head, Agricultural Education
Oregon State University
Corvallis, Oregon

Beverly E. Coleman
Senior Education Research Analyst
Office of Education Research and
Improvement
U.S. Department of Education
Washington, DC

Carol A. Conroy
Assistant Professor and Coordinator Agricultural,
Extension, and Adult
Education
Cornell University
Ithaca, New York

Debbie Constable
Research Assistant
Charles A. Dana Center
University of Texas at Austin
Austin, Texas

Leon Copeland
Professor and Chair
Department of Technology
University of Maryland Eastern Shore
Princess Anne, Maryland

Donna S. Courtney
Director, Workforce Education
Wright State University
Dayton, Ohio

Nick Coviello
Postsecondary Readiness Coordinator
The School District of Philadelphia
Philadelphia, Pennsylvania

Carolyn S. Cox
Director
University of Missouri
Columbia, Missouri

Diane Cyr
Dean, Teaching Learning Center
Community College of Denver
Denver, Colorado

Mercedes Davila-Torres
Director of Planning Office
Department of Education
San Juan, Puerto Rico

Ed Davis
Executive Director
DECA, Inc.
Reston, Virginia

George D. Dean
Professor of Developmental Coordination
and Certification
Professional - Technical Education
Boise, Idaho

Margie A. Doolen
System Director, Marion, Clinton and
Washington Counties Regional Delivery
System
Illinois State Board of Education Team Member
Salem, Illinois

Robin Ducan Brooks
Associate
New York State Education Department
Brooklyn, New York

Sandy Dunkel
Principal Consultant
Illinois State Board of Education
Springfield, Illinois

Ann Dykman
Senior Associate for Communications
MPR Associates, Inc.
Washington, DC

Steven A. Eggland
Professor
University of Nebraska
Lincoln, Nebraska

Claran Einfeldt
Division Administrator
Statewide Mathematics Initiative
Illinois State Board of Education
Springfield, Illinois

Patricia M. Erickson
Professor
Family and Consumer Sciences
Bowling Green State University
Bowling Green, Ohio

Patsy Ethridge-Neal
Acting Manager, Department of
School-to-Work
Seattle School District
Seattle, Washington

Stephen Fardo
Teacher Education Coordinator
Eastern Kentucky University
Richmond, Kentucky

Bruce Farquhar
Agriculture Education Instructor
Altus High School
Altus, Oklahoma

Brenda Ferguson
Governor's Office
Springfield, Illinois

Todd Fields
Assistant Vocational Director/Drafting
Teacher
Westbrook Regional Vocational Center
Westbrook, Maine

Patrick Fitzgerald
Executive Director, Office of Academics
Saint Paul Public Schools
St. Paul, Minnesota

Ann M. Foster
Director, Research and Development Center
for Advancement of Student Learning
Poudre School District
Fort Collins, Colorado

Rosanna Frank
Consultant
New York State Association of Family and
Consumer Science Educators
Chappaqua, New York

Gary R. Galluzzo
Executive Vice President
National Board for Professional Teaching
Standards
Arlington, Virginia

Gary Gara
Technology and Occupational Education
Central Missouri State University
Warrensburg, Missouri

Jerda Garey
Bureau Chief
Iowa Department of Education
Des Moines, Iowa

Yvonne S. Gentzler
Department Chair, Family and Consumer
Sciences
Iowa State University
Ames, Iowa

Lynne Gilli
Program Manager
Maryland State Department of Education
Baltimore, Maryland

Steve H. Godowsky
Principal
Hodgson Vo-Tech High School
Newark, Delaware

Vashti C. Goldstein
Assistant Principal
Eastern Technical High School
Baltimore, Maryland

Kenneth C. Gray
Professor of Education
Penn State University
University Park, Pennsylvania

Robert C. Gray
Director
Maryland Center for Career and Technology
Education Studies
Baltimore, Maryland

Kimberly A. Green
Executive Director
National Association of State Directors of
Vocational Technical Education
Consortium
Washington, DC

H.J. Green
Long Beach Unified School District
Long Beach, California

Kimberly S. Grzankowski
Associate
Council on Competitiveness
Washington, DC

Jewel Hairston
Business Education
Bowling Green State University
Bowling Green, Ohio

Helen Hall
Professor
University of Georgia
Department of Occupational Studies
Athens, Georgia

Dennis Harden
Coordinator for Vocational-Technical
Education
Missouri Department of Elementary and
Secondary Education
Jefferson City, Missouri

Cynthia Harper
Department Head, Curriculum and
Instruction
Jacksonville State University
Jacksonville, Alabama

Henry C. Harper
Executive Director
Tech Prep Delaware
Dover, Delaware

Gisela Harkin
Career Development Program Officer
U.S. Department of Education
Washington, DC

Betty Heath-Camp
Professor and Program Leader,
Vocational and Technical Education
Virginia Tech
Blacksburg, Virginia

Paige M. Henry
Assistant Director
Tech Prep Delaware
Dover, Delaware

Thomas Henry
Director, Office of School-to-Career
and College Initiatives
New Jersey Department of Education
Trenton, New Jersey

Ricardo Hernandez
Chief - PIB/DNP
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Scott Hess
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Jean Kyle Hill
Business Education Specialist
Minnesota Department of Education
Roseville, Minnesota

Gary Hoachlander
President
MPR Associates, Inc.
Berkeley, California

Carol Hodes
Coordinator, Center for Professional
Development
Penn State University
University Park, Pennsylvania

Theresa Hollander
Director of Articulation
University System of Maryland
Adelphi, Maryland

Charles R. Hopkins
Director, National Research Center
University of Minnesota
St. Paul, Minnesota

Dan Hull
President and CEO
CORD
Waco, Texas

Dennis H. Hunt
Teacher
Waxahachie High School
Garland, Texas

Carlette Huntley
Education Program Specialist
U.S. Department of Education
Washington, DC

Brent Jacobsen
Education Program Specialist
Oregon Department of Education
Salem, Oregon

Deborah Johnson
Curriculum Specialist
Baltimore City Public School System
Baltimore, Maryland

Kelly Johnson
State Program Administrator
Oklahoma Department of Vo-Tech
Stillwater, Oklahoma

Karen H. Jones
Professor
University of Georgia
Athens, Georgia

Jean Jonker
Curriculum Content Specialist
Massachusetts Department of Education
Malden, Massachusetts

Rodney Kelly
Director, Division of Career and Technical
Education
Kentucky Department of Education
Frankfort, Kentucky

Robert Kemmery
Principal
Eastern Technical High School
Baltimore, Maryland

Melba Kennedy
Program Coordinator II
Louisiana Department of Education
Baton Rouge, Louisiana

Brenda Kihl
Coordinator/Curriculum Designer
Collin County Community College
Frisco, Texas

Roy D. Kimmins, Jr.
Scientific and Technical Visualization
Teacher
Southwest Guilford High School
High Point, North Carolina

Nancy Knapp
Assistant Professor
School of Professional Studies
University of Georgia
Athens, Georgia

Allene Knedlik
Vice President/Academic and Student Affairs
Allen County Community College
Iola, Kansas

Paula Kurth
Coordinator, Vocational Teacher Licensure
CETE
The Ohio State University
Columbus, Ohio

Karen Kwandrans
Project Staff Assistant
Buffalo State College
Buffalo, New York

Ken Lake
Director
Lexington Technology Center
Lexington, South Carolina

Carol A. Lanning
Senior Director for Program Planning and
Accountability
Illinois Community College Board
Springfield, Illinois

Richard Larson
U.S. Department of Education
Washington, DC

Robert Laudeman
Director of Incumbent Workers Services
Midpenn Workforce Performance
Center
York, Pennsylvania

Doug Lauen
Research Associate
MPR Associates, Inc.
Berkeley, California

Mary Lou Lebo
Instructor
Penn State University
University Park, Pennsylvania

Howard D. Lee
Dean, College of Technology, Engineering
and Management
University of Wisconsin-Stout
Menomonie, Wisconsin

Carolyn S. Lee
Education Research Analyst
U.S. Department of Education
Washington, DC

Jeff Lucas
Lead Specialist
Maryland State Department of Education
Baltimore, Maryland

Victoria L. Lukich
School Improvement Coordinator
David Douglas High School
Portland, Oregon

Richard L. Lynch
Professor and Director
School of Leadership and Lifelong Learning
University of Georgia
Athens, Georgia

Christopher Lyons
Director, Workforce Education and STW
Maine Department of Education
Augusta, Maine

David R. Mandel
Director
MPR Center for Curriculum and
Professional Development
Washington, DC

Sock-Foon Chew MacDougall
State Education Policy Analyst
Maryland Higher Education Commission
Annapolis, Maryland

Jean Marcey
Assistant Professor
University of Alaska Anchorage
Anchorage, Alaska

Ranaye J. Marsh
Dean, School of Applied Technology
Idaho State University
Pocatello, Idaho

Robert A. Martin
Professor and Head of Agricultural
Education
Iowa State University
Ames, Iowa

Mary Ann Marvil
Program Specialist
Maryland State Department of Education
Baltimore, Maryland

Brian McAlister
Associate Professor
University of Wisconsin - Stout
Menomonie, Wisconsin

Gay Nell McGinnis
Director, Family and Consumer Sciences
Education
Texas Education Agency
Austin, Texas

Stephanie McGriff
Title I Coordinator
Los Angeles Unified School District
Los Angeles, California

Floyd L. McKinney
Director
National Dissemination Center for Career
and Technical Education
Columbus, Ohio

Kathleen M. McNally
Program Manager
Skills USA - VICA
Leesburg, Virginia

Patricia W. McNeil
Assistant Secretary for Vocational and Adult
Education
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Anna Melodia
Director of Educational Programs
National FFA Organization
Indianapolis, Indiana

Patricia Merrick
Career and Technical Supervisor
Louisiana Department of Education
Baton Rouge, Louisiana

Laura K. Messenger
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Cheryl A. Minibs
Teacher Educator
Family and Consumer Sciences Education, SMSU
Springfield, Missouri

Bill Moser
Program Officer
U.S. Department of Education
Washington, DC

Joanne Newcomer
Director, Business Education, Management
& Technology
Missouri Department of Elementary and
Secondary Education
Jefferson City, Missouri

Godfrey I. Nwoke
Coordinator, Occupational and Technology
Teacher Education
New York City Technical College/CUNY
Brooklyn, New York

Terrance P. O'Brien
Professor
North Carolina State University
Raleigh, North Carolina

Jane Oates
Education Advisor
Committee of Health, Education, Labor
and Pensions
U.S. Senate
Washington, DC

Katharine M. Oliver
Assistant State Superintendent
Division of Career Technologies and Adult
Learning
Maryland State Department Of Education
Baltimore, Maryland

Karmellia Olson
Education Program Consultant
Kansas State Department of Education
Topeka, Kansas

Virginia Osgood
Instructor, OCTED
University of Central Oklahoma
Edmond, Oklahoma

Angie Paccione
Associate Director, Project Promise
Associate Professor, School of Education
Colorado State University
Fort Collins, Colorado

Allen Phelps
Director
Center on Education and Work
University of Wisconsin-Madison
Madison, Wisconsin

Evan Pierce
Training Coordinator
Collin County Community College
Allen, Texas

Richard Porr
Education Department Chair
Missouri Western State College
St. Joseph, Missouri

David Pucel
Professor
University of Minnesota
St. Paul, Minnesota

Susan Pynchon
Teacher
High Tech High
San Diego, California

Gene Reed
Director, Marketing Education, Arts and
Communication
Missouri Department of Elementary and
Secondary Education
Jefferson City, Missouri

John Renzelman
Division Head, Applied Science
Wayne State College
Wayne, Nebraska

James R. Richter
Curriculum Specialist
Baltimore City Public School System
Baltimore, Maryland

Rebekah Robertson
Editor
Association for Career and Technical
Education
Alexandria, Virginia

Barbara Roche
Executive Director
Regional Education and Business Alliance
Chicopee, Massachusetts

Larry Rosenstock
Principal/CEO
High Tech High
San Diego, California

Chet Rzonca
Associate Professor
University of Iowa
Iowa City, Iowa

Gerhard L. Salinger
Program Officer
National Science Foundation
Arlington, Virginia

Nilda L. Santos-Loyo
General Supervisor
Department of Education
San Juan, Puerto Rico

Thomas Sargent
Center on Education and Work
University of Wisconsin-Madison
Madison, Wisconsin

Keith Schmidli
Higher Education Faculty
Buffalo State College
Buffalo, New York

Jim Schoelkopf
Education Program Specialist
Oregon Department of Education
Salem, Oregon

Robin Schott
School-to-Work State Coordinator
Oklahoma Department of Vocational-Technical
Education
Stillwater, Oklahoma

Freddie Scott
Associate Professor
University of Arkansas
Fayetteville, Arkansas

Ralph Shibley
University of Rio Grande
Columbus, Ohio

Marsha Silverberg
Deputy Director
National Assessment of Vocational
Education
U.S. Department of Education
Washington, DC

Catherine Smith
Supervisor, Teacher Preparation
Michigan Department of Education
Lansing, Michigan

Ann M. Southworth
Assistant to the Superintendent for Vocational
and Technical Education
Roger L. Putnam Vocational Technical
High School
Springfield Public Schools
Springfield, Massachusetts

Ken Spellman
Assistant Supervisor, Industrial Technology
Omaha Public Schools
Omaha, Nebraska

George Spicely
Education Program Specialist
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Karen Spencer-May
Assistant Supervisor
Omaha Public Schools
Omaha, Nebraska

Sally Spieker-Slaughter
Program Manager
Alaska Department of Education and Early
Development
Juneau, Alaska

Mary Stecklein
Tech Prep Coordinator
CCCOES
Denver, Colorado

Adria Steinberg
Program Director
Jobs for the Future
Boston, Massachusetts

Daisy L. Stewart
Associate Professor, Vocational and
Technical Education
Virginia Tech
Blacksburg, Virginia

Elizabeth Teles
Program Director
National Science Foundation
Arlington, Virginia

Greg Thompson
Agricultural Education
Oregon State University
Corvallis, Oregon

Susan Toy
Program Analyst
U.S. Department of Education
Washington, DC

Gail Trapnell
Consultant, Planning
Georgia Department of Education
Atlanta, Georgia

Jerry Tuchscherer
Associate Dean, College of Education
University of Idaho
Moscow, Idaho

Rosco C. Vaughn
Executive Director
National Council for Agricultural Education
Alexandria, Virginia

Richard A. Walter
Associate Professor
Penn State University
University Park, Pennsylvania

Frank Walton
Associate Specialist
University of Hawaii
Honolulu, Hawaii

Joan Warren
Associate Professor
Oklahoma State University
Oklahoma, Oklahoma

Peggie Weeks
Program Director
National Science Foundation
Arlington, Virginia

Jared Wells
Teacher
High Tech High
San Diego, California

Kenneth Welty
Professor
Communication, Education and Training
Department
University of Wisconsin
Menomonie, Wisconsin

Jane Whisner
Program Director
Indiana University of Pennsylvania
Indiana, Pennsylvania

Chester Wichowski
Assistant Center Director
Center for Vocational Education
Temple University RH-356
Philadelphia, Pennsylvania

Pariece Wilkins
Program Education Specialist
Office of Vocational and Adult Education
U.S. Department of Education
Washington, DC

Elizabeth Wilkins-Canter
Assistant Professor
Towson University
Baltimore, Maryland

John L. Williams
Director, Career and Technical Preparation
Michigan Department of Career
Development
Lansing, Michigan

Thomas R. Winters
Assistant Director
Pennsylvania Department of Education
Harrisburg, Pennsylvania

Jerry Wircenski
Professor
University of North Texas
Denton, Texas

Carl A. Woloszyk
Professor
Western Michigan University
Rogers City, Michigan

Michael D. Wright
Coordinator, Technology and Occupational
Education
Central Missouri State University
Warrensburg, Missouri

Peggi Zelinko
Office of the Secretary
U.S. Department of Education
Washington, DC